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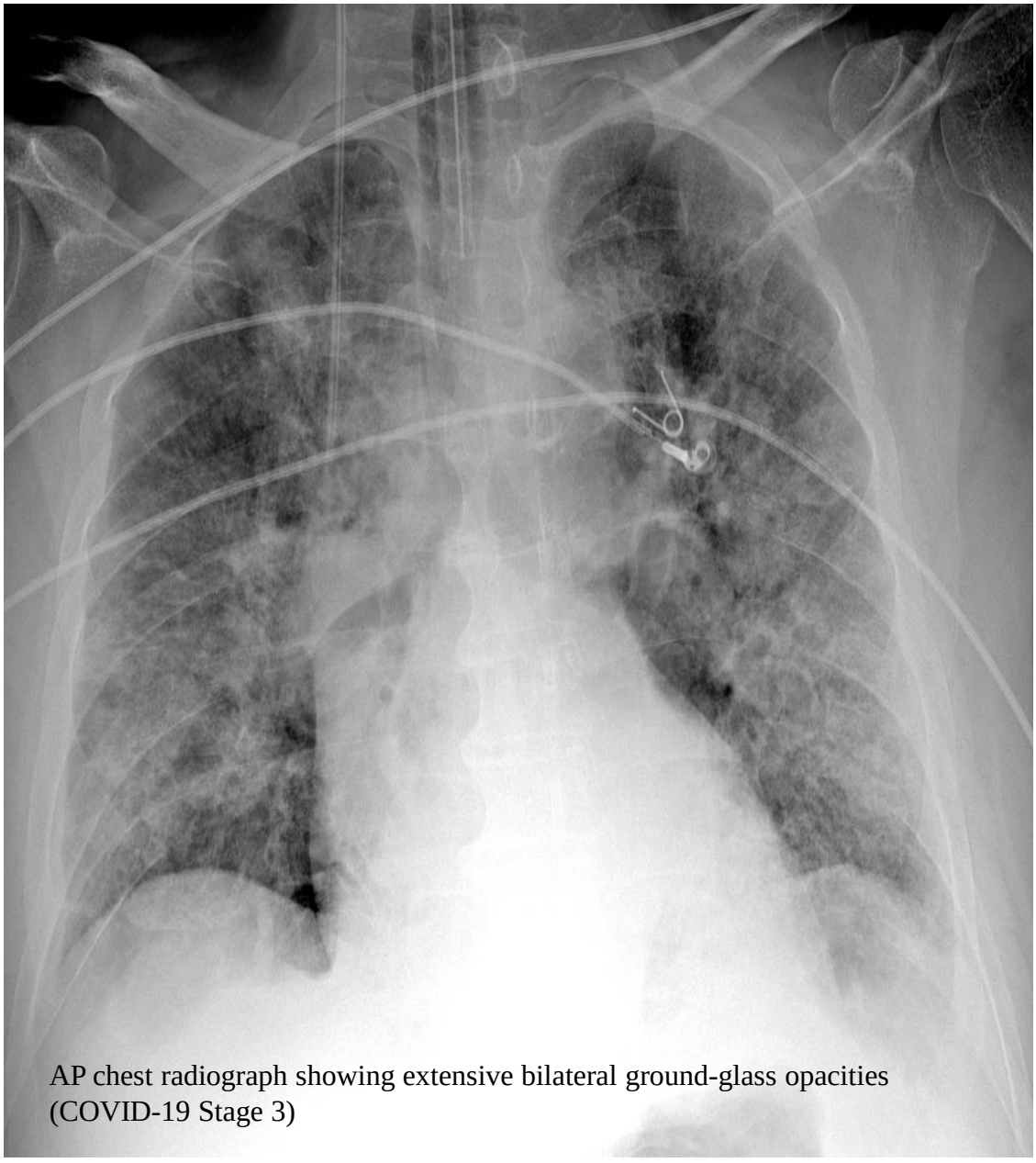

AP chest radiograph showing extensive bilateral ground-glass opacities (COVID-19 Stage 3)

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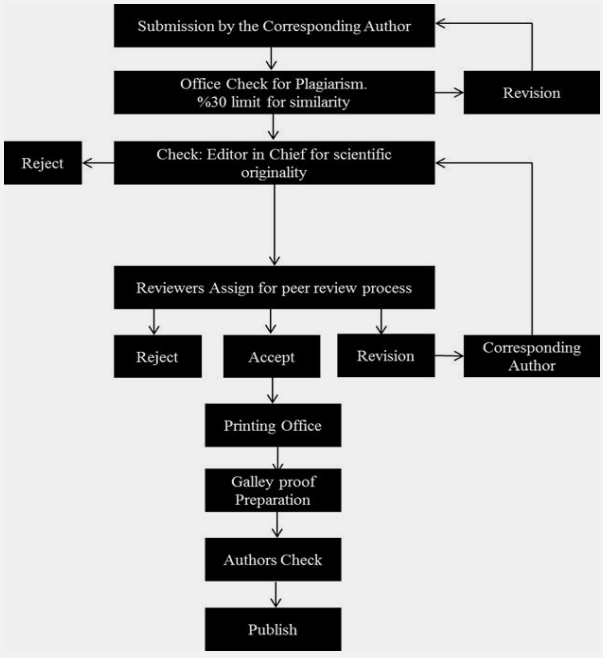

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Review Article Doi: 10.36472/msd.v7i8.411

Radiological Changes observed in Covid 19 Pneumonia and utilization of CT scan as a screening tool along with a real-time reverse transcriptase-polymerase chain reaction (rRT-PCR) for effective diagnosis

Bisma Mukhtar[1]*, Muhammad Omar Mukhtar[2], Bilal Malik[3]

Abstract

Objective: In this review article, Symptom and diagnosis of SARS-COV-2 or more commonly known as COVID-19 viral infection have been reviewed based on current literature. The CT scan, rRT-PCR results for infected patients have been focused on.

Keywords: COVID-19, SARS-COV-2, Pneumonia, Radiological Changes, CT, rRT-PCR, Screening Tool

Introduction

Coronaviruses (enveloped RNA viruses) are a group of viruses giving rise to illnesses such as the common cold, Severe acute respiratory syndrome (SARS), and the Middle East respiratory syndrome (MERS) (1,2,3).

Coronavirus disease of 2019 (Covid 19) is an infectious disease caused by a new coronavirus; severe acute respiratory syndrome coronavirus 2 (SARS COV 2) which emerged in Wuhan, China spreading globally resulting in the coronavirus pandemic of 2019-2020, as declared by WH Recent evidence shows that this SARS COV 2 shares similar pathogenesis of pneumonia to that caused by SARS-COV and MERS-COV.O in March 2020 (4,5).

Recent evidence shows that this SARS COV 2 shares similar pathogenesis of pneumonia to that caused by SARS-COV and MERS-COV (3,6).

It is a zoonotic disease belonging to the beta coronaviruses and indicating the bat as the natural host as identified by several research groups (7).

Before 2019

There are seven types of Coronaviruses (CoV) known to infect humans: 229E (alpha CoV), NL63 (alpha CoV), OC43 (beta CoV), HKU1 (beta CoV), MERS-CoV (beta CoV), SARS-CoV (beta CoV), and the most recent SARS-CoV-2. Most of these cause self-limiting upper respiratory infection or the 'common cold'; however, occasionally other organ systems are involved and may cause severe complications (8). The earliest viral isolate of CoV was done in 1960 (9).

Earlier published studies on MERS-CoV indicate most common finding on chest radiograph to be ground-glass opacities (66%) followed by lung consolidation (18%)(10) with a preference towards lower lobes and the peripheral zones (11). Another study on MERS-CoV suggested that using a similar scoring criterion to Covid 19, patients with a score of >10 on day 10 of viral exposure required intubation to minimize fatal outcomes (12).

Signs and Symptoms of COVID-19

Covid 19 usually manifests as systemic as well as/or respiratory symptoms which consist of fever, shortness of breath, dry cough, myalgia, headache, fatigue, and breathing difficulty (13).

Rare symptoms include nausea, vomiting, diarrhea, nasal congestion, chest tightness, and palpitations (14). In severe disease manifestation, it may cause pneumonia, kidney failure, severe acute respiratory syndrome, and death (2).

Remarkable signs of viral pneumonia comprise of decreased oxygen saturation, blood gas deviations, lymphopenia, increased PT (Prothrombin Time), elevated levels of LDH (Lactate Dehydrogenase) and inflammatory markers (C-reactive protein, D-dimers, and proinflammatory cytokines) (15).

Novel reports also suggest that gastrointestinal and asymptomatic infections are also seen in young children (4, 16).

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The most prominent risk factors for mortality are old age (>70 years) and underlying health issues; hypertension being the most frequent, proceeded by diabetes mellitus and coronary artery disease (17, 18).

Diagnosis

Covid 19 is a highly contagious disease leading to a large increase in the number of affected individuals day by day thereby rendering diagnostic tools a crucial part to overcome the crisis. In relation to rRT-PCR, chest CT imaging seems to be a more practical, dependable and fast method to assess and diagnose COVID-19, especially in areas of epidemic spread (19).

As chest CT is routinely used for the diagnosis of pneumonia hence forming a convenient tool for diagnostic workup, disease progression, prognosis and follow up of the disease (20).

Imaging has limited sensitivity in the early course of the disease but in severe disease, only 3% are found to have normal chest x rays thus making it an effective tool for diagnosis (21, 22).

RT-PCR

The definitive diagnostic test for Covid 19 is Real-Time Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) so far and is considered to have low sensitivity, reported being ranging between 60-70% but relatively high specificity (23) depending on the country, thereby rendering false negatives a huge problem to label a person disease-free.

However, the long processing time and uncertain outcomes of RT-PCR in the early course of the disease have made it evident the need for an effective screening tool to complement the early diagnosis of the disease.

X-RAY Changes

Findings observed in chest x-ray include asymmetric migratory lesions, bilateral perihilar infiltration, and ill-defined patchy or diffuse air space opacities (consolidation) which progressed diffusely later eventually indicating deterioration. Mild bronchiectasis was also observed in the lesion. However, diagnosing Covid 19 on chest radiography is likely to be challenging specifically in patients with mild symptoms and low severity (24, 25).

The figures mentioned above shows the course of progression of changes observed in Covid 19 pneumonia starting from ill-defined opacities in the lower lobes as shown in (figure 1) followed by radiological worsening with bilateral and peripheral alveolar consolidations (figure 2) leading to radiological worsening demonstrating ARDS (figure 3) ultimately showing extensive ground glass opacities (figure 4).

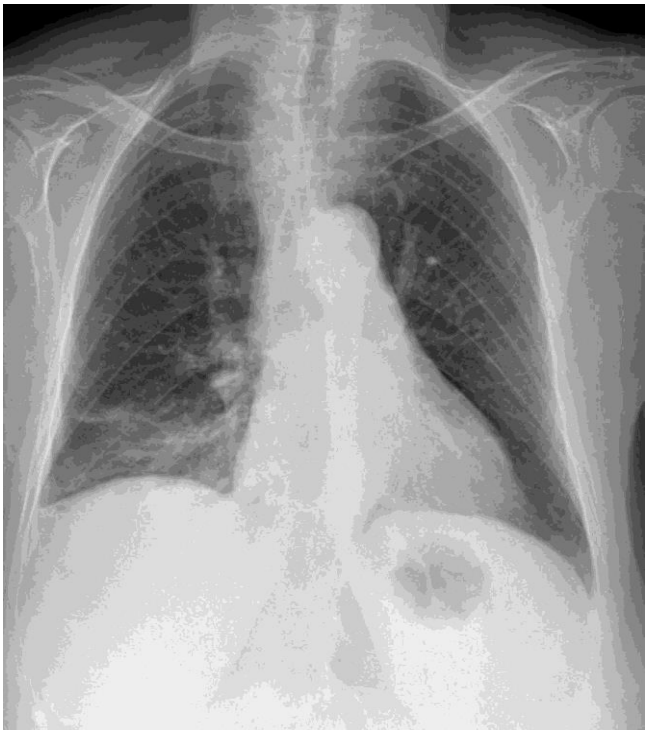

Figure 1: Opacity in the right lower lobe (Stage 1) (26).

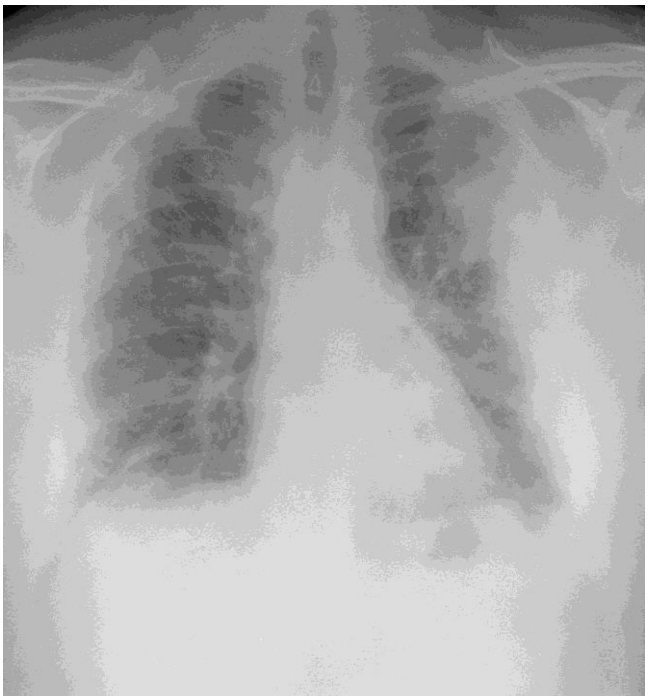

Figure 2: Radiological worsening with bilateral and peripheral alveolar consolidations, more prominent in the left lung (Stage 2) (27).

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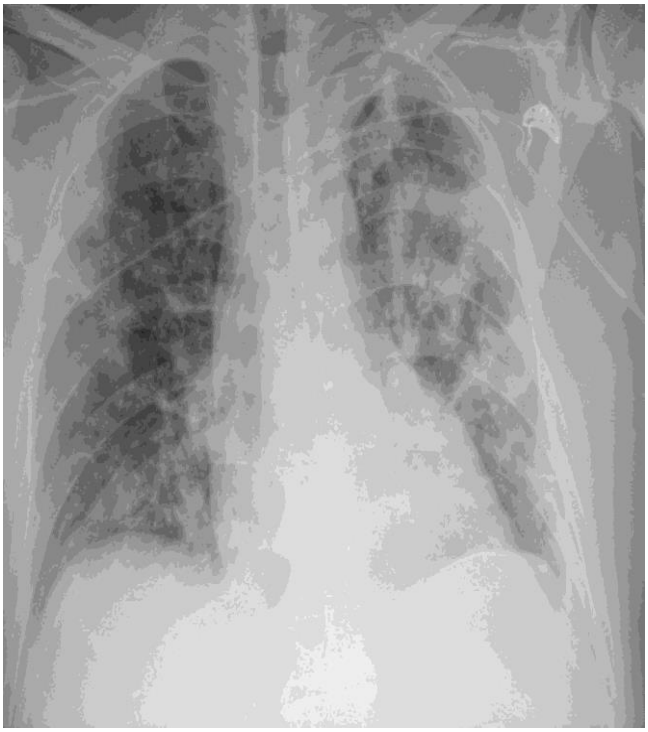

Figure 3: Radiological worsening with disease progression and findings consistent with ARDS (Stage 3) (27).

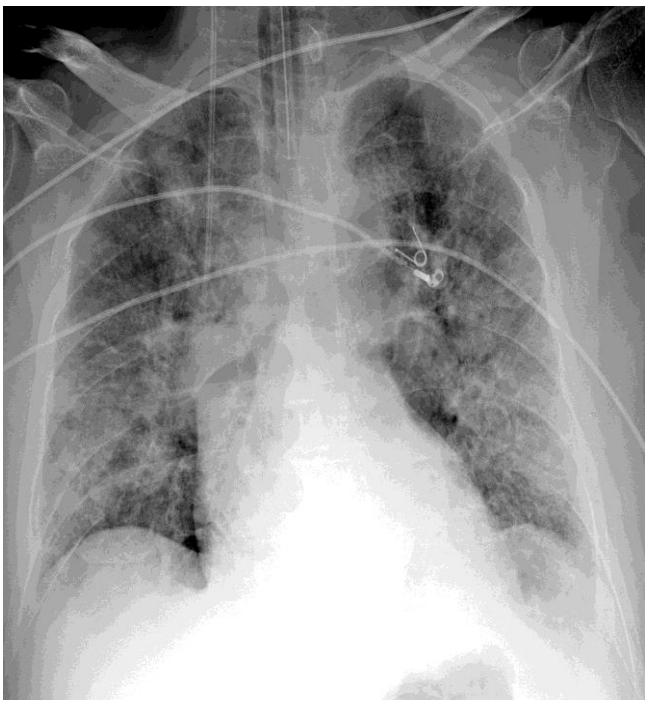

Figure 4: AP chest radiograph showing extensive bilateral ground-glass opacities (Stage 3) (28).

Computer Tomography (CT) CHANGES

CT scan has appeared to be a sensitive modality in the detection of Covid 19 pneumonia even in initial stages of disease (asymptomatic population) and may be used as a screening tool along with RT-PCR in patients having recent travel history or contact with a Covid positive individuals (25).

The average lead time appeared to be 3 days in the diagnosis of viral infection by CT scan concerning RT-PCR (29).

Imaging by chest radiography typically demonstrates diffuse or patchy asymmetric airspace opacities, identical to other pneumonia types of coronavirus origin (20).

Single inspiratory films of CT were taken in a study carried out in China establishing that CT scans showed ground-glass opacities (GGO) in 56% patients while 18% had no significant radiological findings initially. Peripheral, subpleural, and bilateral circumscribed round nodular GGO are the classic CT findings, nevertheless, they are indefinite. Alveolar exudates, consolidation, crazy paving appearance (GGO with interlobular septal thickening), reverse halo sign, and linear opacities all are included in radiological findings as the disease progresses. Early in the disease process, the lesions are unilateral, later manifesting bilaterally. In 88% of the cases, lower lobes are predominantly involved (4).

In another study for 18 out of 21 patients, the total CT score peaked after 10 days of the onset of symptoms with a calculated total score of 6 and then gradually decreased first forming residual parenchymal bands followed by the absorption stage (26 days after symptom onset) in which consolidation and paving pattern started absorbing gradually (4).

A semi-quantitative system of scoring was employed to evaluate the pulmonary involvement, the total chest CT score was calculated as the total lung involvement (5 pulmonary lobes, score 1-5 for each lobe, with a range from 0 as none and 25 as maximum). 0, no involvement; 1, <5% involvement; 2, 25% involvement; 3, 26%-49% involvement; 4, 50%-75% involvement and 5, >75% involvement (30).

Four stages were defined, depending upon lung involvement on CT scans:

Stage 1/Early Stage (0-4 days): GGO in 75% of patients, Total CT score 2 ± 2

Stage 2/Progressive Stage (5-8 days): expanded crazy paving pattern in 53% of patients, Total CT score 6 ± 4

Stage 3/ Peak Stage (9-13 days): consolidation in 91% patients, Total CT score peaked at 7 ± 4

Stage 4/ Absorption Stage (>=14 days): the gradual resolution of consolidation in 75% of patients, Total CT score 6 ± 4 (30).

Centrilobular nodules, pneumothorax, mediastinal lymphadenopathy, pleural effusions, and tree in bud opacities may indicate atypical causes of pneumonia.

Involvement of more than four lung zones bilaterally and gradual deterioration of airspace consolidation on CT chest greater than 12 days after the onset of symptoms despite aggressive treatment is paired with worse outcomes (20).

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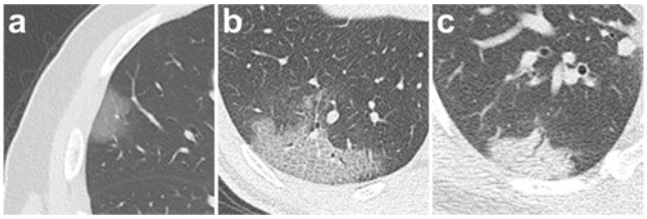

Figure 5: CT chest findings of pneumonia by COVID-19 as seen on trans axial images. (a) Early-stage showing GGO as the typical radiological feature distributed subpleural in the lower lobes (Total CT score 2±2) (31). (b) Progressive stage demonstrating crazy-paving pattern (Total CT score 6±4) (c) Peak stage showing Consolidation (Total CT score 7±4) (30).

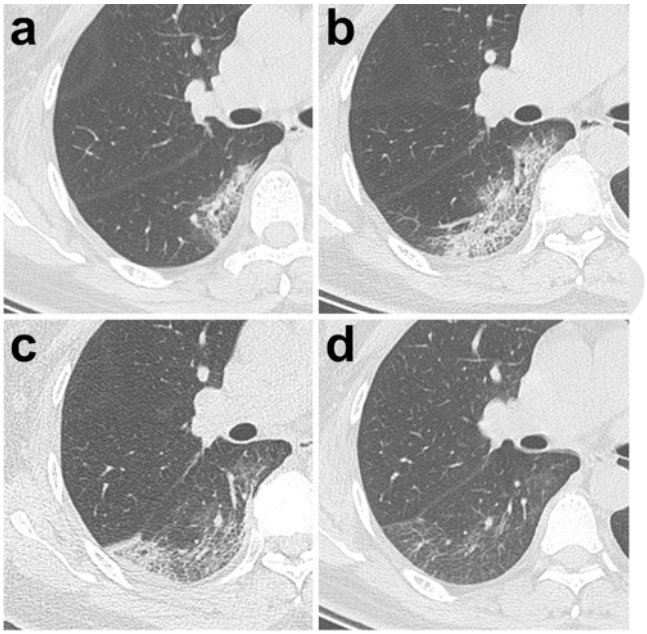

Figure 6: CT chest findings of a 47-year-old Covid 19 case who presented with a constant fever of 38.8°C for 3 consecutive days. (a) EARLY STAGE (day 3), subpleural GGO in addition to partial consolidation as shown in the lower right lobe (b) PROGRESSIVE STAGE (day 7), expanded zone of GGO with overlapping inter-and intralobular thickening of septa (the crazy-paving pattern) and partial consolidation. (c) PEAK STAGE (day 11), GGO with subpleural consolidation. (d) ABSORPTION STAGE (day 20), continued resolution with nominal remaining GGO and parenchymal bands (30).

Comparison of covid 19 with non-covid19 pneumonia

Despite the fact that the imaging features are closely related to those of SARS and MERS, the bilateral involvement of the lungs on initial imaging is more likely to be associated with COVID-19 on the other hand, the early abnormalities were seen in SARS and MERS frequently demonstrate a unilateral spread (20).

Compared to Covid 19, Non-Covid 19 pneumonia is presumably to have peripheral and central distribution, pleural thickening, air bronchogram, pleural effusion and lymphadenopathy that are not characteristically seen in pneumonia caused by Covid 19 (32).

In 83% of the patients with MERS, the initial radiographic changes include multifocal airspace opacities later extending into perihilar and upper lobes with 33% leading to lung fibrosis in patients having prolonged ICU admission along with extensive lung involvement in the acute phase of the disease.

In patients having SARS, fibrosis may also occur in about 1/3rd of the patients in addition to traction bronchiectasis and rarely honeycombing (19).

However, in other types of viral pneumonia, the classical pattern is observed as bilateral consolidations, bronchial wall thickening, nodular opacities, and mild pleural effusions. Lobar consolidation is an uncommon finding in viral pneumonias (33).

Sensitivity of ct scan in relation to RT-PCR

Typical chest CT findings seem to play a pivotal role in screening and diagnosing individuals having negative results from swab test thus having higher sensitivity comparable to RT PCR, however, unremarkable chest imaging does not rule out the infection as initial findings may be normal in about 14% of the patients (34, 35).

Another study presented by a team at the Taizhou Enze Medical Center (Group) Enze Hospital on 19 February 2020 revealed that a chest CT scan for COVID-19 has greater sensitivity (98%) in comparison to the polymerase chain reaction (71%) (36).

Owing to the delays in laboratory testing, limited resources and a huge number of symptomatic individuals CT might serve as an effective screening tool in diagnosing individuals having false negative RT-PCR to control the pandemic (25).

Conclusion

In conclusion, the emergence of this pandemic poses many challenges for our health care systems and much research on effective strategies needs to be developed with a multidisciplinary approach to combat this crisis.

Initial changes evident on CT scan include bilateral ground-glass opacities, consolidation, septal thickening, and paving opacities peaking on the 10th day after symptom onset and resolving gradually after 26th day. An integrated criterion combining CT as well as rRT PCR is desirable and will help to accomplish greater reliability of diagnosis in clinical practice. Chest CT in addition to being fast, reliable and relatively easy to perform has high specificity but moderate sensitivity in differentiating between Covid 19 and non-Covid 19 pneumonia hence exceeding DNA detection tests like RT-PCR (2).

Radiologists are encouraged to use the scoring system mentioned earlier and make a confirmatory diagnosis to lessen the burden of rRT PCR and decrease the overall anxious atmosphere in ER. History of contact and travel history plays a fundamental role in diagnosing and preventing the spread. Thus, relying on the exposure

history, clinical symptoms and CT features rather than rRT-PCR tests alone would aid more rapid detection of disease and may allow for efficient control of viral transmission. Quarantining the patient is also critical for controlling the transmission due to the highly contagious nature of this disease.

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Conflict of interest: The authors declare that they have no conflict of interest.

References

1. Corman VM, Muth D, Niemeyer D, Drosten C. Chapter Eight - Hosts and Sources of Endemic Human Coronaviruses. In: Kielian M, Mettenleiter TC, Roossinck MJ, editors. Advances in Virus Research. 100: Academic Press; 2018. p. 163-88.
2. Yin Y, Wunderink RG. MERS, SARS and other coronaviruses as causes of pneumonia. Respirology. 2018;23(2):130-7.
3. Li Y-C, Bai W-Z, Hashikawa T. The neuroinvasive potential of SARS-CoV2 may play a role in the respiratory failure of COVID-19 patients. Journal of Medical Virology.n/a(n/a).
4. Velavan T, Meyer C. The Covid-19 epidemic. Tropical Medicine & International Health. 2020;25.
5. The Lancet Infectious D. COVID-19, a pandemic or not? The Lancet Infectious Diseases.
6. Wang L-s, Wang Y-r, Ye D-w, Liu Q-q. A review of the 2019 Novel Coronavirus (COVID-19) based on current evidence. International Journal of Antimicrobial Agents. 2020;55:105948.
7. Guo Y-R, Cao Q-D, Hong Z-S, Tan Y-Y, Chen S-D, Jin H-J, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak – an update on the status. Military Medical Research. 2020;7(1):11.
8. Corman VM, Muth D, Niemeyer D, Drosten C. Hosts and sources of endemic human coronaviruses. Advances in virus research. 100: Elsevier; 2018. p. 163-88.
9. Kendall E, Bynoe M, Tyrrell D. Virus isolations from common colds occurring in a residential school. British medical journal. 1962;2(5297):82.
10. Das KM, Lee EY, Jawder SEA, Enani MA, Singh R, Skakni L, et al. Acute Middle East Respiratory Syndrome Coronavirus: Temporal Lung Changes Observed on the Chest Radiographs of 55 Patients. American Journal of Roentgenology. 2015;205(3):W267-S74.
11. Das KM, Lee EY, Enani MA, AlJawder SE, Singh R, Bashir S, et al. CT Correlation With Outcomes in 15 Patients With Acute Middle East Respiratory Syndrome Coronavirus. American Journal of Roentgenology. 2015;204(4):736-42.
12. Cha MJ, Chung MJ, Kim K, Lee KS, Kim TJ, Kim TS. Clinical implication of radiographic scores in acute Middle East respiratory syndrome coronavirus pneumonia: Report from a single tertiary-referral center of South Korea. European Journal of Radiology. 2018;107:196-202.
13. Shi F, Yu Q, Huang W, Tan C. 2019 Novel Coronavirus (COVID-19) Pneumonia with Hemoptysis as the Initial Symptom: CT and Clinical Features. Korean J Radiol. 2020;21(5):537-40.
14. Lai C-C, Shih T-P, Ko W-C, Tang H-J, Hsueh P-R. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. International Journal of Antimicrobial Agents. 2020;55(3):105924.
15. Lim J, Jeon S, Shin H-Y, Kim MJ, Seong YM, Lee WJ, et al. Case of the Index Patient Who Caused Tertiary Transmission of Coronavirus Disease 2019 in Korea: the Application of Lopinavir/Ritonavir for the Treatment of COVID-19 Pneumonia Monitored by Quantitative RT-PCR. J Korean Med Sci. 2020;35(6).
16. Zhu Y, Liu Y-L, Li Z-P, Kuang J-Y, Li X-M, Yang Y-Y, et al. Clinical and CT imaging features of 2019 novel coronavirus disease (COVID-19). Journal of Infection.
17. Palacios Cruz M, Santos E, Velázquez Cervantes MA, León Juárez M. COVID-19, una emergencia de salud pública mundial. Revista Clínica Española. 2020.
18. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. The Lancet. 2020.
19. Ai T, Yang Z, Hou H, Zhan C, Chen C, Lv W, et al. Correlation of Chest CT and RT-PCR Testing in Coronavirus Disease 2019 (COVID-19) in China: A Report of 1014 Cases. Radiology.0(0):200642.
20. Hosseiny M, Kooraki S, Gholamrezanezhad A, Reddy S, Myers L. Radiology Perspective of Coronavirus Disease 2019 (COVID-19): Lessons From Severe Acute Respiratory Syndrome and Middle East Respiratory Syndrome. American Journal of Roentgenology. 2020:1-5.
21. Guan W-j, Ni Z-y, Hu Y, Liang W-h, Ou C-q, He J-x, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. New England Journal of Medicine. 2020.
22. Rodrigues JCL, Hare SS, Edey A, Devaraj A, Jacob J, Johnstone A, et al. An update on COVID-19 for the radiologist - A British society of Thoracic Imaging statement. Clinical Radiology.
23. Kanne JP, Little BP, Chung JH, Elicker BM, Ketai LH. Essentials for Radiologists on COVID-19: An Update—Radiology Scientific Expert Panel. Radiology.0(0):200527.
24. Cheng S-C, Chang Y-C, Fan Chiang Y-L, Chien Y-C, Cheng M, Yang C-H, et al. First case of Coronavirus Disease 2019 (COVID-19) pneumonia in Taiwan. Journal of the Formosan Medical Association. 2020;119(3):747-51.
25. Lee EYP, Ng M-Y, Khong P-L. COVID-19 pneumonia: what has CT taught us? The Lancet Infectious Diseases.
26. Lorente E. COVID-19 Pneumonia Case, rID : 75189. Radiopaedia; 2020.
27. Lorente E. Rapidly progressive ARDS secondary to COVID-19 infection, Case 16660. Eurorad; 2020.
28. Macori F. COVID-19 Pneumonia Case, rID : 74867. Radiopaedia.
29. Li Y, Xia L. Coronavirus Disease 2019 (COVID-19): Role of Chest CT in Diagnosis and Management. American Journal of Roentgenology. 2020:1-7.
30. Pan F, Ye T, Sun P, Gui S, Liang B, Li L, et al. Time Course of Lung Changes On Chest CT During Recovery From 2019 Novel Coronavirus (COVID-19) Pneumonia. Radiology. 2020:200370.
31. He F, Deng Y, Li W. Coronavirus disease 2019: What we know? J Med Virol. 2020;92(7):719-25.
32. Bai HX, Hsieh B, Xiong Z, Halsey K, Choi JW, Tran TML, et al. Performance of radiologists in differentiating COVID-19 from viral pneumonia on chest CT. Radiology. 2020:200823.

33. Franquet T. Imaging of Pulmonary Viral Pneumonia. Radiology. 2011;260(1):18-39.

34. Yang W, Cao Q, Qin L, Wang X, Cheng Z, Pan A, et al. Clinical characteristics and imaging manifestations of the 2019 novel coronavirus disease (COVID-19):A multi-center study in Wenzhou city, Zhejiang, China. Journal of Infection. 2020;80(4):388-93.

35. Li D, Wang D, Dong J, Wang N, Huang H, Xu H, et al. False-Negative Results of Real-Time Reverse-Transcriptase Polymerase Chain Reaction for Severe Acute Respiratory Syndrome Coronavirus 2: Role of Deep-Learning-Based CT Diagnosis and Insights from Two Cases. Korean J Radiol. 2020;21(4):505-8.

36. Fang Y, Zhang H, Xie J, Lin M, Ying L, Pang P, et al. Sensitivity of Chest CT for COVID-19: Comparison to RT-PCR. Radiology. 2020:200432.

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Evaluation of the response levels of non-metastatic thyroid cancer patients in the postoperative twelfth month

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Abstract

Objective: Radioactive iodine (RAI) is used to ablate residual thyroid tissue after total thyroidectomy. The aim of this study was to evaluate the response according to the12th-month results of thyroid cancer patients and to investigate the changes in response level during follow-up.

Materials and Methods: The study included 97 patients, comprising 88 (90.7%) females and 9 (9.3%) males, with a mean age of 41.68±13.25 years. None of the patients had lymph node or distant metastasis and all received RAI therapy. Thyroid-stimulating hormone (TSH), thyroglobulin (TG), and anti-TG levels and neck USG were examined in the 12th-month. Response to therapy was evaluated as an excellent response, biochemical incomplete response, structural incomplete response, or indeterminate response.

Results: In the 12th month, 80 patients (82.47%) had excellent response, 13 patients (13.40%) had an indeterminate response, 3 patients (3.09%) had structural incomplete response and 1 patient (1.03 %) had biochemical incomplete response. Of the 80 patients with excellent response, 15 had no follow-up after the 12th month. The remaining 65 patients were followed up for 31.11±9.58 months. The response changed to indeterminate in the 18th month in 1 (1.54%) patient, and to structural incomplete response in the 35th month in 1 (1.54%) patient. The 13 patients with indeterminate responses were followed up for 20.61±6.28 months.

Conclusion: The TG level at 12th months provides accurate data about the course of the disease especially in patients with excellent response. Patients with excellent response in the 12th month may be followed up less often and those with indeterminate or incomplete response should be followed up more often.

Keywords: thyroid cancer, iodine radioisotopes, thyroglobulin

Introduction

Thyroid cancer is the most common endocrine malignancy. Differentiated thyroid cancers, papillary and follicular thyroid cancers, account for more than 90% of all thyroid cancers (1). Surgery is the cornerstone in the management of thyroid cancer with ablative RAI as an adjuvant treatment in selected cases based on the risk of recurrence and disease-specific mortality. In recent years, the rate of total thyroidectomy has increased. Preoperative investigation of patients with thyroid cancer with high-resolution ultrasound imaging has led to an increase in the detection of contralateral nodules identified preoperatively, resulting in total thyroidectomy instead of lobectomy, regardless of the histological status of the contralateral thyroid nodule (2).

Radioactive iodine-131 (RAI-131) is used in the treatment of differentiated thyroid cancer. RAI and thyroid hormone suppression are complementary to surgery as the primary treatment modality (3).

Thyroid cancer does not accumulate iodine to the same degree as functional thyroid cells do. Serum TSH levels are increased to maximize RAI uptake in thyroid remnants and to ablate malignant cells with postoperative ablative therapy (4). RAI whole-body scan and serum thyroglobulin measurements are used to detect local recurrences and distant metastases. Therefore, the ablation of thyroid remnants after total thyroidectomy increases the sensitivity and specificity of RAI whole-body scan and thyroglobulin measurements (5).

The aim of this study was to evaluate the response, by examining neck USG, TG, and anti-TG levels after surgery and RAI therapy during a 12-month follow-up period.

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Materials and Methods

The study included a total of 97 patients, comprising 88 (90.7 %) females, and 9 (9.3%) males, with a mean age of 41.68±13.25 years (range, 15-75 years). All the patients received RAI therapy after surgery and none of the patients had lymph node or distant metastases. Surgery was applied as total thyroidectomy, and RAI therapy was given one month postoperatively. Multicentric tumors were determined in 23 patients. The diameter of the tumors was 15±0.64mm (7-40 mm). Seven patients had 50 mCi, 13 patients 75 mCi, and 77 patients 100 mCi. The patients were followed up at 1, 3, 6 and 12 months, with the 12-month results of serum thyroid-stimulating hormone (TSH), thyroglobulin (TG), and anti-TG levels analysed in this study together with neck USG examination.

Response to therapy was classified as an excellent response (negative imaging and either suppressed TG <0.2 ng/mL or TSH-stimulated TG <1 ng/mL), biochemical incomplete response (negative imaging and suppressed TG ⩾1 ng/mL or stimulated TG ⩾10 ng/mL or rising anti-TG antibody levels), structural incomplete response (structural or functional evidence of disease with any TG level with or without anti-TG antibodies) or indeterminate response (non-specific findings on imaging studies, faint uptake in the thyroid bed on RAI scanning, non-stimulated TG detectable but <1ng/mL or anti-TG antibodies stable or declining in the absence of structural or functional disease). These criteria can be used at any point during the follow-up of patients (6, 7).

Results

The mean TSH level was 0.55±1.41 µIU/mLat12months. The TG level was unmeasurable in 82 patients, and mean 1.13±1.79 ng/mL (min:0.26, max:7.53) in the other 15 patients. The anti-TG level was unmeasurable in 95 patients, and 30.30 and 30.50 IU/ml, respectively in the other 2 patients. After 15 months, the anti-TG level became unmeasurable in 1 of these 2, and in the other, the neck USG and RAI whole-body scintigraphy were clear for residue, recurrence or metastases inthe 12th month. In the 20th month when the TSH level was 0.05, the TG level was 1.97 ve anti-TG level was unmeasurable and the patient was evaluated as biochemical incomplete response. In the 12th month, 80 patients (82.47%) had excellent response, 13 patients (13.40%) had indeterminate response, 3 patients (3.09%) had structural incomplete response and 1 patient (1.03 %) had biochemical incomplete response. Of the 80 patients with excellent response, 15 did not have follow-up after the 12th month. The remaining 65 patients were followed up for 31.11±9.58 (min: 18, max: 54) months. In 1 patient (1.54 %) the response was evaluated as indeterminate response in the 18th month and in 1 (1.54%) as structural incomplete response in the 35th month. The 13 patients with indeterminate response were followed up for an extra 20.61±6.28 (min:15, max:40) months. During this follow-up period, 5 (38.46%) patients still had indeterminate response, 5 (38.46%) became biochemical incomplete response, and 3 (23.08%) became excellent response. One patient with biochemical incomplete response was evaluated with structural incomplete response in the 20th month (Figure 1).

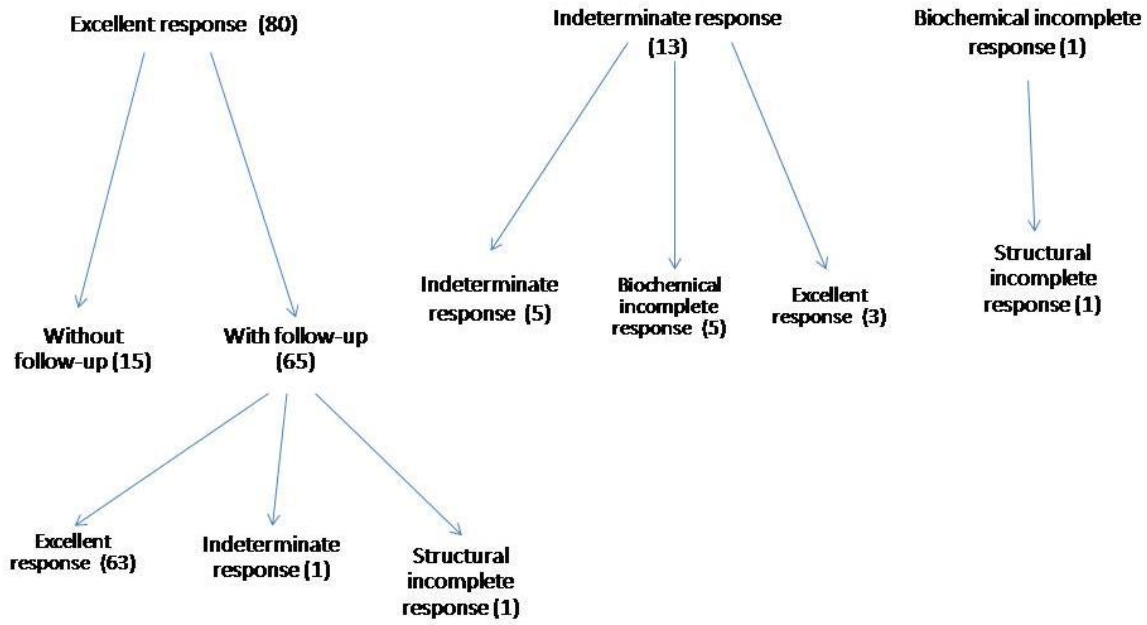

Figure 1. Level of response at 12 months and follow-up after the 12th month

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Discussion

Although advancements in diagnostic techniques and increased medical attention to small thyroid nodules has resulted in the early detection of cancers in small nodules, increasing exposure to diagnostic X-rays and environmental hormone disruptors may also explain part of the observed increase (8). The increase does not only include micro-cancers (<1 cm), but significant increases have also been observed of tumors ⩾4 cm. This shows that diagnostic scrutiny is not the only explanation (9).

Although the outcome of thyroid cancer after effective treatment is generally excellent, some cases have a poorer prognosis. The prognosis is negatively influenced by age, distant metastasis, and lymphadenectomy (10). The initial therapeutic approach is very important in differentiated thyroid cancer because a rigorous initial approach leads to better survival and very low morbidity. RAI refractory cancer has a worse prognosis (11). Papillary thyroid cancer with a low or intermediate risk has an excellent response to initial therapy, and can be defined as non-stimulated TG<0.2 ng/ml. Long-term follow up with clinical examination and periodic non-stimulated TG measurement is sufficient in low or intermediate-risk groups (12). Rigorous follow up enables early detection and treatment of persistent or recurrent locoregional or distant disease. Most recurrences develop in the first 5 years after the first diagnosis, but in a few cases, recurrence may develop even after 20 years (1). Amin et al showed an increasing prevalence of papillary carcinoma and greater prevalence of intermediate risk, and although the likelihood of cancer-related deaths was low, it was not negligible. The magnitude of the RAI ablation dose was found to be the single significant factor affecting the initial ablation success rate and remote metastasis was found to be the single significant prognostic factor in predicting future morbidity (13). Rosario et al reported that non-stimulated TG⩽0.25 ng/ml with negative anti-TG antibodies and no metastases seen on US after thyroidectomy rules out the presence of persistent disease in low-risk papillary thyroid carcinoma patients. This weakens the indication for RAI ablation in this patient group (14).

TG is produced by normal and pathologically altered thyroid follicular cells and plays an important role in well-differentiated thyroid cancers after thyroidectomy and ablative RAI therapy when TG-Ab levels are negative. TG level identifies patients with residual tumor and prevents unnecessary tests in patients who are in remission (15).

TG is generally measured during T4 replacement therapy and elevated values indicate suspicion of cancer relapse with 1 µg/L TG corresponding to 1 g thyroid tissue (16). Pre-RAI TG is a significant risk factor for disease recurrence in patients with differentiated thyroid cancer (17). Postoperative TG levels >10 ng/mL increase the probability of persistent or recurrent disease, failing RAI ablation, and the presence of distant metastases. TG levels may fail to identify patients with a small metastatic volume which are usually located in the neck region and US is the method of choice for nodal disease (18). Non-stimulated TG measurement has predictive value and can be used as a general indicator in the follow up of differentiated thyroid cancer. An increase of TG levels during hormone replacement therapy is a highly suspicious finding and needs further investigation (19). Anti-TG antibodies can be used as an important marker during the follow-up period. A trend of increasing anti-TG antibodies should be investigated for recurrent disease, whereas stable or declining levels do not seem to reflect a risk for recurrence (20). Serum anti-TG levels are present in 25% of differentiated thyroid carcinoma and 10% of the general population. This is important because anti-TG antibodies may interfere with TG measurements (21). As anti-TG antibodies appear against TG emanating from residual benign or malignant thyroid tissue, the evaluation of anti-TG levels has become used as a tumor marker in the follow-up (22). Patients with a progressive increase in TG or anti-TG levels and a negative RAI diagnostic whole-body scintigraphy are evaluated as TENIS syndrome. Carrillo et al reported that intermediate and high-risk differentiated thyroid cancer patients with TG elevation during follow up should probably receive RAI therapy without diagnostic whole-body scintigraphy to prevent treatment delays, increased costs, and TENIS syndrome. The accuracy of diagnostic whole-body scintigraphy was reported to be low and may cause stunning and treatment delay (23).

USG is useful for evaluation of the thyroid bed and cervical lymph nodes because the neck is the most common and treatable site of recurrence. Kim et al stated that in patients with positive TG and negative USG/FDG PET/CT, suppression of hormone replacement and more intensive follow up with neck USG should be applied, because of potential side-effects and discomfort. Empirical RAI therapy should be applied to patients with definite clinical evidence of disease (24).

Schlumberger et al proposed a treatment algorithm for the management of thyroid cancer and distant metastases. According to this algorithm, patients with metastatic differentiated thyroid cancer are managed with appropriate focal treatment (surgery, radiotherapy orthermoablation) RAI, or both, based on the RAI avidity. If one or more metastatic lesions are RAI refractory, RAI treatment should be abandoned (25). Chow et al reported that hemithyroidectomy with central compartment dissection can achieve excellent prognosis in selected cases, and reduces surgical complications and spares patients from undergoing RAI treatment (26).

Patients with low-risk micropapillary thyroid carcinoma treated with thyroidectomy and a low dose of 50 mCi RAI have been shown to have excellent long-term prognosis (27). The rate of successful ablation is higher with intermediate-high RAI therapy (1.85-3.7 GBq) compared with low activity (81.1 GBq) reaching a complete response in most cases. In a study of 277 patients, Albona et al showed extrathyroidal uptake in 27with post-RAI imaging, 17 laterocervical nodal, and 10 distant metastases (28).

The four response to therapy categories used in this study were firstdescribed by Tuttle et al (29) and later modified by Vaisman et al (7, 30). Tuttle et al. stated that the

American Thyroid Association recurrence staging system predicted the risk of recurrence and persistent disease, therefore more effective dynamic risk assessment could be made with this recurrence staging system (29).

Conclusion

The results of this study showed that most of the patients had excellent response after total thyroidectomy and RAI therapy at the 12-month follow-up. After 12 months, an excellent response rarely becomes an indeterminate, structural incomplete or biochemical incomplete response. Of the patients without excellent response, approximately one-sixth (17.65%) showed an excellent response after the 12th month. Patients with an excellent response at 12 months may be followed up less often and those with an indeterminate or incomplete response should be followed up more often.

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Author's contributions: HIA, HY; Study design, Patient treatments, Data Collection, Statistics **HIA;** Manuscript preparation and Revisions

References

1. Pacini F, Castagna MG. Approach to and treatment of differentiated thyroid carcinoma. Med Clin North Am. 2012;96:369-83.
2. Nixon IJ, Ganly I, Patel SG, Palmer FL, Whitcher MM, Ghossein R, et al. Changing trends in well differentiated thyroid carcinoma over eight decades. Int J Surg. 2012;10:618-23.
3. Caron NR, Clark OH. Papillary thyroid cancer: surgical management of lymph node metastases. Curr Treat Options Oncol. 2005;6:311-22.
4. Lawal IO, Nyakale NE, Harry LM, Lengana T, Mokgoro NP, Vorster M, et al. Higher preablative serum thyroid-stimulating hormone level predicts radioiodine ablation effectiveness in patients with differentiated thyroid carcinoma. Nucl Med Commun. 2017;38:222-227.
5. Wang KL, Lin LY, Chen PM, Lin HD. Chronic myeloid leukemia after treatment with 131 for thyroid carcinoma. J Chin Med Assoc. 2005;68:230-3.
6. Vaisman F, Momesso D, Bulzico DA, Pessoa CH, Dias F, Corbo R, et al. Spontaneous remission in thyroid cancer patients after biochemical incomplete response to initial therapy. Clin Endocrinol (Oxf). 2012;77:132-8.
7. Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, et al. 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. Thyroid. 2016;26:1-133.
8. Zhu C, Zheng T, Kilfoy BA, Han X, Ma S, Ba Y, et al. A birth cohort analysis of the incidence of papillary thyroid cancer in the United States, 1973-2004. Thyroid. 2009;19:1061-6.
9. Chen AY, Jemal A, Ward EM. Increasing incidence of differentiated thyroid cancer in the United States, 1988-2005. Cancer. 2009;115:3801-7.
10. Borges AKDM, Ferreira JD, Koifman S, Koifman RJ. Differentiated thyroid carcinoma: a 5-years survival study at a referral hospital in Brazil. Rev Saude Publica. 2019;53:106.
11. Sciuto R, Romano L, Rea S, Marandino F, Sperduti I, Maini CL. Natural history and clinical outcome of differentiated thyroid carcinoma: a retrospective analysis of 1503 patients treated at a single institution. Ann Oncol. 2009;20:1728-35.
12. Rosario PW, Mourão GF, Calsolari MR. Can the follow-up of patients with papillary thyroid carcinoma of low and intermediate risk and excellent response to initial therapy be simplified using second-generation thyroglobulin assays? Clin Endocrinol (Oxf). 2016;85:596-601.
13. Amin A, Badwey A, El-Fatah S. Differentiated thyroid carcinoma: an analysis of 249 patients undergoing therapy and aftercare at a single institution. Clin Nucl Med. 2014;39:142-6.
14. Rosario PW, Mourão GF, Siman TL, Calsolari MR. A low postoperative nonstimulated serum thyroglobulin level excludes the presence of persistent disease in low-risk papillary thyroid cancer patients: implication for radioiodine indication. Clin Endocrinol (Oxf). 2015;83:957-61.
15. González C, Aulinas A, Colom C, Tundidor D, Mendoza L, Corcoy R, et al. Thyroglobulin as early prognostic marker to predict remission at 18-24 months in differentiated thyroid carcinoma. Clin Endocrinol (Oxf). 2014;80:301-6.
16. Giovanella L, Castellana M, Trimboli P. Unstimulated high-sensitive thyroglobulin is a powerful prognostic predictor in patients with thyroid cancer. Clin Chem Lab Med. 2019;58:130-37.
17. Spaas M, Decallonne B, Laenen A, Billen J, Nuyts S. Prognostic Value of Stimulated Thyroglobulin Levels at the Time of Radioiodine Administration in Differentiated Thyroid Cancer. Eur Thyroid J. 2018;7:211-217.
18. Prpić M, Franceschi M, Romić M, Jukić T, Kusić Z. Thyroglobulin as a tumor marker in differentıatedthyroıd cancer - clinical considerations. Acta Clin Croat. 2018;57:518-27.
19. Girelli ME, De Vido D. Serum thyroglobulin measurements in differentiated thyroid cancer. Biomed Pharmacother. 2000;54:330-3.
20. de Meer SGA, Vorselaars WMCM, Kist JW, Stokkel MPM, de Keizer B, Valk GD, et al. Follow-up of patients with thyroglobulin-antibodies: Rising Tg-Ab trend is a risk factor for recurrence of differentiated thyroid cancer. Endocr Res. 2017;42:302-10.
21. Spencer CA, Takeuchi M, Kazarosyan M, Wang CC, Guttler RB, Singer PA, et al. Serum thyroglobulin autoantibodies: prevalence, influence on serum thyroglobulin measurement, and prognostic significance in patients with differentiated thyroid carcinoma. J Clin Endocrinol Metab. 1998;83:1121-7.
22. Gianoukakis AG. Thyroglobulin antibody status and differentiated thyroid cancer: what does it mean for prognosis and surveillance? CurrOpin Oncol. 2015;27:26-32.
23. Carrillo JF, Vázquez-Romo R, Ramírez-Ortega MC, Carrillo LC, Gómez-Argumosa E, Oñate-Ocaña LF. Prognostic Impact of Direct 131I Therapy After Detection of Biochemical Recurrence in Intermediate or High-Risk Differentiated Thyroid Cancer: A Retrospective Cohort Study. Front Endocrinol (Lausanne). 2019;10:737.
24. Kim WG, Ryu JS, Kim EY, Lee JH, Baek JH, Yoon JH, et al. Empiric high-dose 131-iodine therapy lacks efficacy for treated papillary thyroid cancer patients with detectable serum thyroglobulin, but negative cervical sonography and 18F-fluorodeoxyglucose positron emission tomography scan. J Clin Endocrinol Metab. 2010;95:1169-73.

25. Schlumberger M, Brose M, Elisei R, Leboulleux S, Luster M, Pitoia F, et al. Definition and management of radioactive iodine-refractory differentiated thyroid cancer. Lancet Diabetes Endocrinol. 2014;2:356-8.

26. Chow TL, Choi CY, Lam SH. Disease control of differentiated thyroid carcinomas by hemithyroidectomy. Singapore Med J. 2010;51:311-4.

27. Michalaki M, Bountouris P, Roupas ND, Theodoropoulou A, Agalianou N, Alexandrides T, et al. Low-risk papillary thyroid carcinoma patients who underwent near-total thyroidectomy without prophylactic central compartment lymph node dissection and were ablated with low-dose 50mCi RAI had excellent 10-year prognosis. Hormones (Athens). 2016;15:511-17.

28. Albano D, Bonacina M, Durmo R, Bertagna F, Giubbini R. Efficacy of low radioiodine activity versus intermediate-high activity in the ablation of low-risk differentiated thyroid cancer. Endocrine. 2020;68:124-31.

29. Tuttle RM, Tala H, Shah J, Leboeuf R, Ghossein R, Gonen M, et al. Estimating Risk of Recurrence in Differentiated Thyroid Cancer After Total Thyroidectomy and Radioactive Iodine Remnant Ablation: Using Response to Therapy Variables to Modify the Initial Risk Estimates Predicted by the New American Thyroid Association Staging System. Thyroid. 2010;20:1341-9.

30. Vaisman F, Shaha A, Fish S, Michael Tuttle R. Initial therapy with either thyroid lobectomy or total thyroidectomy without radioactive iodine remnant ablation is associated with very low rates of structural disease recurrence in properly selected patients with differentiated thyroid cancer. Clin Endocrinol (Oxf). 2011;75:112-9.

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Transfusion in autoimmune hemolytic anemia: comparison of two different strategies

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Abstract

Objective: Autoimmune Hemolytic Anaemia (AIHA) is a condition in which red blood cells (RBC) are destroyed by autoantibodies. Clinicians tend to avoid the transfusion in AIHA patients who has difficulties during pre-transfusional testing. Depending on the institutional policy, the transfusion of the selected least incompatible RBC unit is a strategy. Since ORh(-) RBCs are the universal RBC donor type, the transfusion of the group ORh(-) RBC is selected in AIHA patients. In this study, we compared the effects of group ORh(-) RBC or least match incompatible same type of blood product transfusion in AIHA patients.

Material and Methods: The study included newly-diagnosed AIHA patients without active bleeding who required transfusion due to symptomatic anemia. ORh(-) RBC was transfused to the patients who had different blood groups and for the other patients, the least match incompatible same type blood product was transfused. Pre- and post-transfusion hematological and biochemical indicators were reported and compared.

Results: We determined that; there was no significant difference between groups regarding the increase in Hb levels and hemolysis parameters. In correlation analysis, the lower the pre-transfusion MCV value, the higher the LDH change. The lower the pre-transfusion MCV value, the decrease in hemolysis was higher.

Conclusion: Clinicians should not avoid transfusion for critically anemic AIHA patients for whom compatible RBC has not been found. Both group ORh(-) types of RBCs and same type least incompatible RBCs can be preferred for transfusion in critically patients when further compatibility testing procedures for alloantibodies detection cannot be performed.

Keywords: Autoimmunity, Hemolytic Anemia, Transfusion Reaction

Introduction

Autoimmune Hemolytic Anaemia (AIHA) is a condition in which red blood cells (RBC) are destroyed by autoantibodies and removed from the bloodstream by the immune system before their normal lifespan is over. If the rate of hemolysis is greater than hematopoiesis, severe symptoms of acute anemia develop and patients may become decompensated. In the literature, there is no absolute contraindication to RBC transfusion for AIHA patients, as it remains a safe procedure (1). According to the recent guidelines, if a patient has cardiopulmonary symptoms due to anemia, transfusion recommended regardless of hemoglobin level(2). However, generally, clinicians avoid transfusion due to the difficulties in pre-transfusion testing to provide the serologically compatible RBCs. Alloantibodies that were hidden by auto-antibodies, found in up to 40% of AIHA patients and may cause a new hemolytic status(3,4). Special tests are recommended to determine the presence of an alloantibody and proper cross-matching since triggering a new hemolytic status.

In clinical practice, procedures cannot be routinely performed in all transfusion centers due to the cost-effectiveness and time-consuming.

As difficulties experienced during pre-transfusion testing, transfusion of the selected least incompatible RBC unit is a strategy in some centers(5). Since O, Rh(D)-negative RBCs are the universal RBC donor type, mostly use of these RBCs before the completion of compatibility testing is advised, such as the setting of trauma or patients with the unanticipated hemorrhage who require an urgent transfusion (6). Depending on the institutional policy, the transfusion of group O, Rh(D)-negative RBC is selected in AIHA patients with difficulties during pre-transfusion testing. In this study, we aimed to determine the efficacy and safety of transfusion strategies by analyzing demographic and clinical characteristics of the patients in the era of different transfusion strategies

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Material and Methods

Baseline Characteristic

The study included newly-diagnosed warm-type AIHA patients without active bleeding who required transfusion due to symptomatic anemia with the hemoglobin (Hb) level of <7gr/dl. Other causes of acquired or hereditary hemolytic anemia, such as paroxysmal nocturnal hemoglobinuria and glucose-6-phosphate dehydrogenase deficiency were excluded. The patients had no previous history of transfusion or hematological disease but had comorbidities including diabetes mellitus, coronary heart disease or hypertension.

The selected patients had difficulties to find a compatible RBC unit during cross-match testing. Blood grouping was confirmed and further immunological testing included DAT, auto-antibody detection, auto-control, and indirect antiglobulin test (IAT) were applied to incompatible RBC units using gel technology (DiaMed, BİoRAd, Switzerland). Groups were randomized according to age comorbidities and blood grouping. O Rh (-) blood product was transfused to the patients who had different blood groups (group 1). For the other patients, the least match incompatible same type of blood product was transfused (group 2). Least incompatible type-specific RBC units were selected in the bank reserve. All procedures in the laboratory and selection of the RBC product were made by the technician on duty. Methylprednisolone 1mg/kg/day was initiated at the diagnosisof all patients for AIHA treatment.

Transfusions and Hemolysis Parameters

In this study, the age of the patients, chronic disease status, hemodynamic instability, and Hb status were considered when deciding to transfusion. Without comorbidity and/or younger patients who cannot tolerate a sudden decrease in Hb were transfused due to hemodynamic instability. None of the patients had any premedication such as steroids or antihistamines before transfusion. Transfusions were observed by medical professionals to identify any evidence of acute hemolysis. Each patient received 2 consecutive RBC units in a single procedure. Each transfusion was started from the same vascular access and finished as rapidly as tolerated, with the complete transfusion not exceeding 4 hours. Vital signs and complaints of patients attributed to possible acute transfusion reactions such as dyspnea, headache, hypotension, back pain, fever, tachycardia, and chills were recorded by the observer. Symptoms indicating hemolysis were observed, and in case of an attributable sign, the transfusion was stopped.

Pre- and post-transfusion (24 hours after transfusion) hematological and biochemical indicators of hemolysis, including Hb, hematocrit (HCT), percentage of reticulocyte (RETIC %), serum lactate dehydrogenase (LDH), serum total and unconjugated bilirubin levels were reported and compared. The increase in Hb levels (Hb Δ) calculated with the formula (post-transfusion Hb level - pretransfusion Hb level) was compared by pre- and post-transfusion hemogram parameters.

Statistical Analysis

Data obtained in the study were analyzed statistically using SPSS version 20.0 software (Chicago, IL, USA). Categorical variables were stated as number (n) and percentage (%), parametric variables as mean ± standard deviation, and non-parametric variables as median and range values. In the comparison of parametric and non-parametric data between two dependent groups, the Paired Samples t-test or the Wilcoxon test was applied, respectively.

Variables and outcomes between two independent groups were compared using the Mann-Whitney U and Independent Sample-t-test for non-parametric and parametric variables, respectively.Chi-square tests were used to compare categorical variables. Pearson or Spearman correlation analyses were performed. All statistical tests were two-sided, and a value of $P<0.05$ was considered statistically significant.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. As a standard of care/action in our department, the patient records confirmed that all the study patients gave informed consent at the time of hospitalization and before the transfusion and other relevant diagnostic/therapeutic standards of care.

Results

Patients Characteristic

Totally 17 units of RBCs transfused to 35 newly-diagnosed AIHA patients (28 males, 7 females) with a mean age of 62.63± 1.98 years. 34 units of group O, Rh(D)-negative RBC were transfused to 17 AIHA patients and 36 units of type-specific RBC were transfused to 18 patients.

The mean age and sex frequency of groups were similar. All patients (100%) had IgG type autoantibodies whereas 10 patients (58.8%) in group 1 and 14 patients (77.7%) in group 2 had C3d + type autoantibodies. The demographic data of all the patients and the transfusion units are presented in Table 1. All the transfusions in two groups were completed without any complications or signs of hemolysis.

Hematological parameters

The increase in Hb levels (Hb Δ) was observed in both patient groups following the transfusions (1.50±0.54 for group 1 and 1.67±0.66 for group 2). However, no statistically significant difference was found between the two transfusion strategies ($p>0.05$).

There was no correlation between Hb Δ and a pre-transfusional parameter which may affect Hb increments. Parameters related to pre- and post-transfusion were detailed in Table 2.

Biochemical parameters

Hemolysis parameters that including LDH, total and unconjugated bilirubin were decreased in both groups after transfusion. Parameters indicating hemolysis were not found statically different in two methods (p:0.79, 0.17 and 0.22 resp.).

Detailed biochemical parameters are given in Table 2. In correlation analysis, there was significant correlation only with LDH Δ and pre-transfusion MCV (p:0.001, r:-0.53) and bilirubin (p:0.002, r:-0.51) levels (Table 3.)

Table1. The demographic and antibody data of the patients

Parameter	Total (n=35)	According to transfused blood product	
		Group1(n=17)	Group 2(n=18)
Age	62.63±1.98	62.82±2.94	62.44±2.76
Gender			
Male	28(80%)	13 (76.5%)	15(83.3%)
female	7 (20%)	4(23.5%)	3(16.7%)
Direct coombs (n. %)			
IgG(+)	35 (100%)	17 (100%)	18 (100%)
IgG(+). C3(+)	24 (68.5%)	10 (58.8%)	14 (77.7%)
Indirect Coombs(+) (n. %)	26 (74%2)	15 (88.2%)	11 (61.1%)

Table2. Pre- and post-transfusional hematological and biochemical assessment

Parameter	*Group 1 (N=17)*	*Group 2(N=18)*	*p*
Pre-Transfusion	5.78±0.18	5.58±0.27	*0.57*
Hb (g/dL) (Mean±SD) Hct (%)	16.94±0.63	18.11±1.07	*0.36*
(Mean±SD) MCV(fL)	111.76±1.79	110.94±2.13	*0.77*
(Mean±SD)	878.0 (577.55-1304.80)	802.0(644.58-1696.52)	*0.47*
Median LDH (range)	4.05±0.39	4.60±0.64	*0.48*
Total bilirubin (mg/dL) (Mean±SD)	3.38±0.36	3.85±0.55	*0.48*
Unconjugated bilirubin (mg/dL) (Mean±SD)			
Post-Transfusion	7.28±0.17	7.26±0.22	*0.94*
Hb (g/dL) (Mean±SD) Hct (%)	21.88±0.69	22.00±0.80	*0.91*
(Mean±SD) MCV(fL)	103.76±1.83	105.83±2.05	*0.46*
(Mean±SD)	688.0 (470.37-938.69)	677.0 (478.90-1296.76)	*0.49*
Median LDH (IU/L) (range)	2.90±0.30	3.60±0.51	*0.21*
Total bilirubin (mg/dL) (Mean±SD)	2.23±0.27	3.06±0.45	*0.13*
Unconjugated bilirubin (mg/dL) (Mean±SD)			
Δ value Hb (Mean±SD)	1.50±0.54	1.67±0.66	*0.40*
Median LDH (range)	-120.0 (-26.0 -1528.0)	-161.0 (-18.0 -1203.0)	*0.79*
Median Total bilirubin (range)	-0.70 (0 -3.40)	-0.65(0 -2.0)	*0.17*
Median Unconjugated bilirubin (range)	-0.90 (0 -3.0)	-0.60(0.10 -2.9)	*0.22*

Table3. Pre- and post-transfusional hematological and biochemical correlation

Parameter	Δ Hb	Δ Total Bilirubin P value (r*)	Δ Unconjugated bilirubin P value (r*)	Δ LDH P value (r*)
Age	0.22	0.38	0.7	0.11
Sex	0.28	0.37	0.12	0.35
Pre- transfusion				
Hb	<0.001	0.32	0.53	0.25
Hct	0.27	0.18	0.14	0.15
Mcv	0.004	0.42	0.69	0.001(-0.53)
LDH	0.16	0.64	0.98	0.59
Total bil	0.44	<0.001(-0.67)	<0.001(-0.72)	0.002(-0.51)
Unconjugated bil	0.44	<0.001(-0.65)	<0.001(-0.67)	0.002(-0.49)
Post-transfusion				
Hb	0.69	0.74	0.86	0.73
Hct	0.65	0.59	0.56	0.64
Mcv	0.1	0.92	0.77	0.14
LDH	0.32	0.98	0.67	0.88
Total bil	0.72	0.12	0.2	0.14
Unconjugated bil	0.61	0.15	0.33	0.15

Discussion

In this study, we compared the effects of O Rh (-) RBC or least match incompatible same type RBC transfusion in AIHA patients and we determined that; there was no significant difference between groups regarding the increase in Hb levels and hemolysis parameters. In correlation analysis, the lower the pre-transfusion MCV value, the higher the LDH change. The lower the pre-transfusion MCV value, the decrease in hemolysis was higher.

There is no absolute contraindication to RBC transfusion in AIHA patients, as it remains a safe procedure. But autoantibodies often cause laboratory problemsdetermining ABO and Rh groups problematic and preventing effective antibody screening due to cross-reacting antibody (7). Therefore, clinicians tend to avoid transfusion in AIHA patients who has difficulties during the pre-transfusional test. For these patients, serological investigations are recommended to determine the presence of alloantibodies and proper cross-matching since trigger a new hemolytic status. However, despite providing phenotypically matched RBC reduces the risk of hemolysis, it does not totally eliminate the transfusion-related hemolytic status. Furthermore, the feasibility of these tests seems to be disadvantageous as time-consuming for patients who require urgent transfusion.

Depending on the institutional policy, mostly transfusion of the least incompatible RBC unit selected by seeking out all RBC products in the bank reserve. Recently, some reports demonstrate the safety and feasibility of this strategy (8-10). Different than the other studies, we investigated the Hb increments and hemolysis risk of transfusion with Group O, Rh(D)-negative RBC which is the universal RBC donor type. In these patients matching blood with the patient's own type is recommended due to the risk of transfusion reaction due to underlying alloantibodies theoretically(11). However, to the best of our knowledge, there is no any report that is confirmed by studies.

In the current study, a significant elevation in Hb levels was recorded in both groups following transfusions. Furthermore, a statically significant difference was not noticed between the groups. Due to severe anemic symptoms of the patients, two units of RBC transfused for each patient. Since the age of donors RBCs was expected to be younger, two units of RBC were transfused to clarify Hb increments. Parks et al. compared the post-transfusion Hb and hemolysis parameters in AIHA patients positive for alloantibodies only or those without RBC-specific antibodies (9). They reported the findings did not support newly-developed hemolysis in all groups. In our study, a decrease in hemolysis parameters was observed in the following days of transfusion which was associated with the regression of hemolysis over time. We consider that initiated steroid therapy may be effective to control the hemolysis.

Recently Chen et al. reported a large retrospective study on hospitalized AIHA patients. They analyzed the rate of transfusion reactions with the use of least incompatible RBCs (10). They found that patients who had lower Hb levels at baseline were the most benefited group from the least incompatible RBC transfusion. The remission rate was found higher in AIHA patients with Hb<6g/dl at admission. In our study efficacy of transfusion may be associated with mean initial Hb level was <6 g/dL.

A concerning problem in the transfusion of group O RBC to non-O recipients is limited number of group O products. It is not recommended routinely in daily practice except emergency. Therefore, we suggest to use the group O RBC only in cases where a sufficient number of products cannot be scanned for compatibility testing due to the reserve in the bank.

The limitations of the current study were the retrospective design and the small number of the patient population. Since two units of RBC were transfused to the patients, we could not determine the increase corresponding to the 1 unit RBC transfusion.

Conclusion

Clinicians should not avoid transfusion of O Rh (-) types for critically anemic AIHA patients for whom compatible RBC has not been found. Both group O Rh (-) types of RBCs and same type least incompatible RBCs can be preferred for transfusion in critically patients when further compatibility testing procedures for alloantibodies detection cannot be performed. Further, larger prospective studies are warranted to determine the clinical effects of O Rh (-) types for critically anemic AIHA patients.

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References

1. Petz LD. A physician's guide to transfusion in autoimmune haemolytic anaemia. Br J Haematol. 2004;124:712-6.

2. Carson JL, Grossman BJ, Kleinman S, Tinmout AT, Marques MB, Fung MK, et al. Red blood cell transfusion: a clinical practice guideline from the AABB*. Ann Intern Med. 2012;157:49-58.

3. Sokol RJ, Hewitt S, Booker DJ, Morris BM. Patients with red cell autoantibodies: selection of blood for transfusion. Clin Lab Haematol. 1988;10:257-64.

4. Laine ML, Beattie KM. Frequency of alloantibodies accompanying autoantibodies. Transfusion. 1985;25:545-6

5. Ziman A, Cohn C, Carey PM, Dunbar NM, Fung MK, Greinacher A et al. Warm-reactive (immunoglobulin G) autoantibodies and laboratory testing best practices: review of the literature and survey of current practice. Transfusion. 2017;57:463-77.

6. Dutton RP, Shih D, Edelman BB, Hess J, Scalea TM. Safety of uncrossmatched type-O red cells for resuscitation from hemorrhagic shock. J Trauma. 2005;59:1445-9.

7. Maley M, Bruce DG, Babb RG, Wells AW, Williams M. The incidence of red cell alloantibodies underlying panreactive warm autoantibodies. Immunohematology. 2005;21:122-5.

8. Das SS, Zaman RU, Safi M. Incompatible blood transfusion: Challenging yet lifesaving in the management of acute severe autoimmune hemolytic anemia. Asian J Transfus Sci. 2014;8:105-8.

9. Park SH, Choe WH, Kwon SW. Red Blood Cell Transfusion in Patients With Autoantibodies: Is It Effective and Safe Without Increasing Hemolysis Risk?. Ann Lab Med. 2015;35:436-44.

10. Chen C, Wang L, Han B, Qin L, Ying B. Autoimmune hemolytic anemia in hospitalized patients: 450 patients and their red blood cell transfusions. Medicine (Baltimore). 2020;99:e18739.

11. Milkins C, Berryman J, Cantwell C, Haggas R, Jones J, Rowley M et al. Guidelines for pre-transfusion compatibility procedures in blood transfusion laboratories. British Committee for Standards in Haematology. Transfus Med. 2013;23:3-35.

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Endometriosis cases that occurred at the incision site after cesarean section; Single-center experience

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Abstract

Objective: Endometriosis is the growth of functional endometrial gland and stroma outside the uterine cavity. Scar endometriosis is a very rare disease and is diagnosed by histopathologic examination. Endometriosis may be detected in the scar tissue after a previous gynecological operation. Scar endometriosis is a mass consisting of endometrial glands and stroma that may develop in the incision scar tissue or in the neighborhood after gynecologic procedures performed especially by cesarean section. We aimed to present the patients who had a history of gynecologic surgery, who presented with mass and/or pain complaints especially in the corner regions of the previous incision line, and underwent surgical excision and reported as endometriosis as a result of postoperative pathology.

Materials and Methods: Patients who presented to the general surgery outpatient clinic between September 2018 and December 2019 with complaints of palpable mass, pain and swelling at the edge of the pfannenstiel incision were evaluated. The records of patients who underwent surgery with a preliminary diagnosis of endometriosis and reported as endometriosis as a result of pathology were reviewed retrospectively.

Results: Surgical excision was performed in 14 patients with a preliminary diagnosis of endometriosis. The mean age of the patients was 29.5 (min: 18-max: 39 years). All patients had a history of cesarean section as a history of abdominal surgery. When the pathology results were examined, all the reports were endometriosis externa. In the pathology reports, the mean diameter of the lesion was 25x20x17mm (min: 10- max: 40).

Result: Endometriosis should be considered in patients with a history of palpable mass and pain around the incision site in patients with a history of gynecologic surgery.

Keywords: Endometriosis, cesarean section, pfannenstiel incision, pain

Introduction

Endometriosis is the localization of functional endometrial gland and stromal tissue in other organs except the uterine cavity with the stimulation of ovarian hormones (1). Although the etiology is still unclear, the most common theory is considered as implantation theory. Although the lesions are more frequently located in the pelvic region (peritoneal surfaces of the genital organs and adjacent organs in the pelvis), extrapelvic location (intestines, umbilicus, kidney, lung, nose, liver, pancreas skin and abdominal incision scar) can be seen (2). The incidence of endometriosis varies between 8-15% in women during the reproductive period (3). The incidence of surgical scar endometriosis after cesarean delivery ranges from 0.03% to 0.4% (4).

The most common symptoms in endometriosis cases are abdominopelvic pain, dysmenorrhea, dyspareunia, menstrual irregularity and infertility.

In extrapelvic endometriosis cases, the symptoms are quite different and vary depending on the location. The anterior abdominal wall is a rare localization for endometriosis. It has been reported to occur due to previous operations or more rarely spontaneously (5). Although the most common finding in incisional endometriosis cases is a palpable mass at the surgical incision line, it can be seen in cyclic pain and swelling. Doubt is important in diagnosis. Ultrasonography (USG) comes first in the examination after the anamnesis and physical examination of the patients. USG has no specific definition for endometriosis cases. It is generally seen as a hypoechoic mass image containing heterogeneous echoes. Computed tomography (CT) may be performed for further evaluation. It is important to suspect for the diagnosis of endometriosis. Endometriosis may diagnosed by excisional biopsy in patients with nonspecific symptoms after imaging methods.

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We aimed to present the patients had a history of cesarean section in Southeast Anatolian Region where the birth rate is high, who presented with mass and/or pain complaints especially in the corner regions of the previous incision line and underwent surgical excision and reported as endometriosis as a result of postoperative pathology

Materials and Methods

Between September 2018 and December 2019, patients presenting to the general surgery outpatient clinic of Şanlıurfa Training and Research Hospital with complaints of a palpable mass, pain and swelling on the edge of pfannenstiel incision were evaluated. The records of patients who underwent surgery with a preliminary diagnosis of endometriosis and reported as endometriosis as a result of pathology were retrospectively reviewed. Age, sex, abdominal surgery history, preoperative abdominal and/or superficial USG, abdominal CT and magnetic resonance imaging (MRI) findings and pathology reports of the patients were recorded. Surgery duration, postoperative hospital stay, morbidity and complications within the first 30 days were also determined. Excisional biopsy was performed under local anesthesia and spinal anesthesia. Fascial defects were repaired during the operation and no mesh was used. The patients were discharged without any complications.

Statistical analysis: Statistical Package for the Social Sciences (SPSS 21 Inc., Chicago, IL, USA) computer software was used for bio-statistical analyses. When the data were presented as mean values their standard deviation values were given, when they were presented as median values their minimum-maximum values were also stated.

Results

Surgical excision was performed in 14 patients with a preliminary diagnosis of endometriosis. The mean age of the patients was 29.5 (min: 18-max: 39 years). All patients had a history of cesarean section. It was determined that surgical excision was performed 2.7 years (min: 1-max: 4 years) after cesarean section. None of the patients had comorbidities. Preoperative abdominal and/or superficial USG was performed in all patients before surgical excision. When the abdominal and/or superficial USG reports of the patients were examined, they were reported as hypoechoic or hyperechoic solid lesion, fibroma? or lipoma?. Preoperative abdominal CT was performed in 5 (35.7%) patients (Figure 1). When abdominal CT reports were examined, they were reported as hypodense solid lesion, lymph node? or foreign body?. MRI was performed in 1 (7.1%) patient before surgical excision. MRI was reported as 'T1 hypo and T2 heterogeneous hyperintense weak peripheral contrasting area (infective process?) with 2x1 cm lobulated contour within the rectus muscle'. Local anesthesia was performed in 3 (21.4%) patients and spinal anesthesia was performed in 11 (78.5%) patients for surgical excision. The mean operation time was 26.1 min (min 20-max 35 min). No postoperative surgical complications were observed in any of the patients. The mean length of hospital stay after surgery was 1.14 days (min: 1- max: 2 days). Endometriosis externa was diagnosed after the histopathological examination of the surgical specimens revealed endometrial stroma and glands (Figure 2). In the pathology reports, the mean diameter of the lesion was 25x20x17mm (min: 10- max: 40mm). The demographic, radiological and pathological data of the patients are summarized in Table-1.

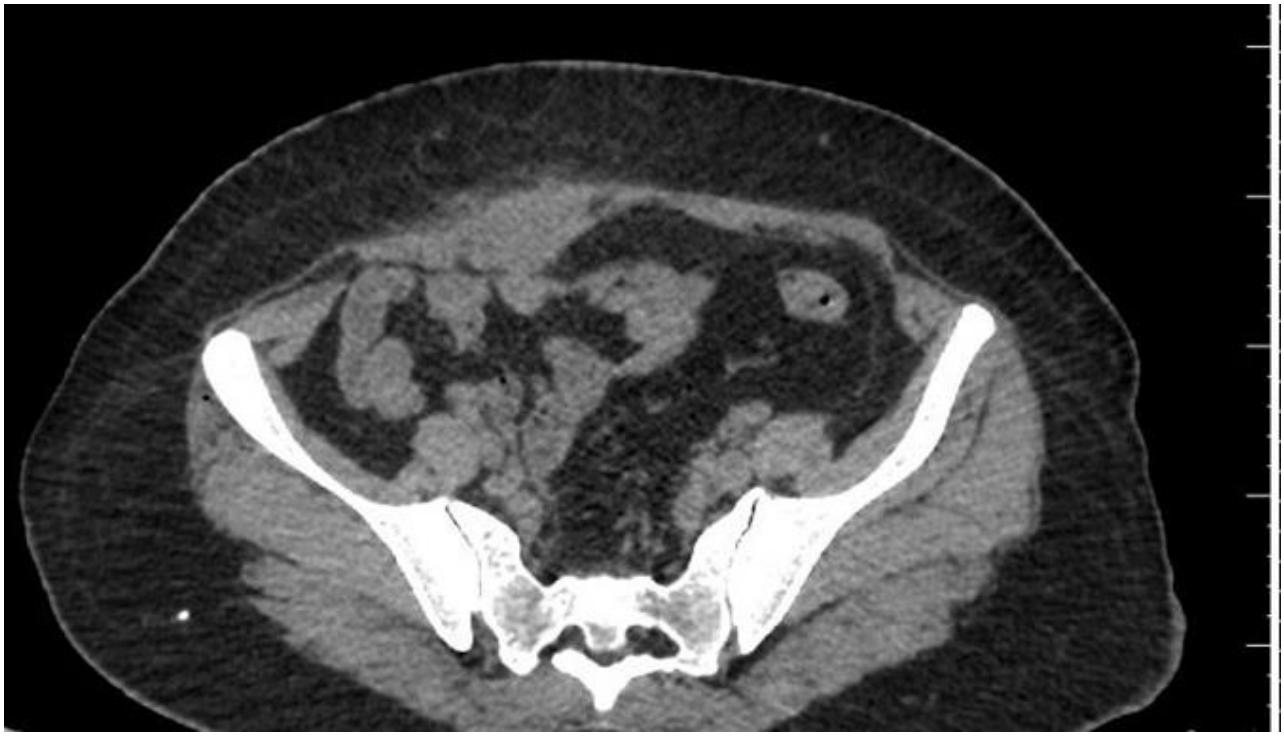

Figure 1: Computer tomography (CT) image

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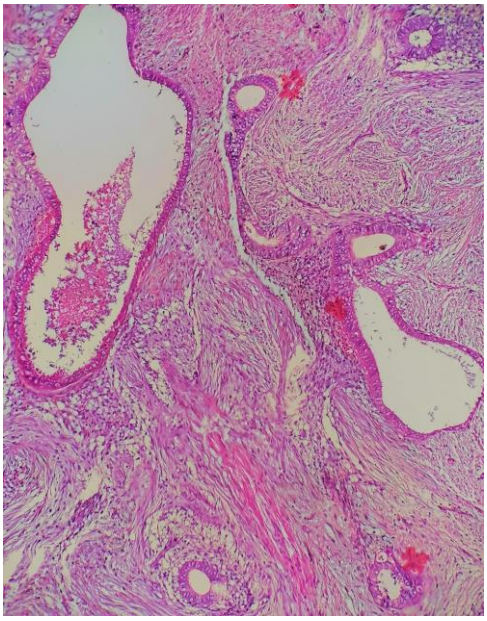

Figure 2: Endometrial glands with hemorrhagic secretion in some cystic enlarged lumens and thin endometrial stroma around them in the fibromuscular stroma (H&E, X100)

Table 1: Demographic, clinical and pathological features of patients

Patient No	Age	Gender	Abdominal surgery history	Preoperative USG findings	Preoperative CT findings	Patology
1	18	F	C/S	32x20 mm smoothly delimited solid lesion (lymph node?)	-	3x3x1 cm endometriosis externa
2	29	F	C/S	35x25 mm smooth surface hypoechoic solid lesion	-	4x2,5x2,5 cm endometriosis externa
3	30	F	C/S	23x12mm hyperechoic solid lesion (lipoma?)	-	2x1,5x1 cm endometriosis externa
4	36	F	C/S	28x14 mm hypoechoic lesion on the anterior abdominal wall (fibroma)	25x15mm hypodense solid lesion on the anterior abdominal wall	2x1,5x1 cm endometriosis externa
5	21	F	C/S	21x10 mm smoothly delimited solid lesion	-	2x1,5x1,5 cm endometriosis externa
6	28	F	C/S	18x10mm hypoechoic solid lesion (fibroma)	18x15mm irregular confined solid lesion on the anterior abdominal wall	2x1,5x1,5 cm endometriosis externa
7	33	F	C/S	32x20mm hypoechoic solid lesion	-	4x3,5x3 cm endometriosis externa
8	39	F	C/S	22x11 mm hypoechoic irregular lesion in rectus muscle	2x1 cm oval lesion in the rectus muscle (foreign body?)	3x2,5x2 cm endometriosis externa
9	36	F	C/S	25x20 mm solid lesion with smooth borders	25x29mm solid lesion on the anterior abdominal wall	3x2x2 cm endometriosis externa
10	25	F	C/S	12x6mm smooth confined hypoechoic solid lesion (fibroma?)	-	2x2x1,5 cm endometriosis externa
11	25	F	C/S	10x6 mm isoechoic lesion (lipoma?)	-	2x1,5x1,5 cm endometriosis externa
12	31	F	C/S	12x5 mm oval shaped hypoechoic solid lesion (lymph node?)	On the anterior abdominal wall11mm lymph node?	2x1,5x2 cm endometriosis externa
13	29	F	C/S	22x14mm hypoechoic solid lesion (lymph node?)	-	2x2x1,5 cm endometriosis externa
14	33	F	C/S	18x9mm hypoechoic solid lesion (lymph node?), Rectus sheath hematoma?	-	2x2,5x2 cm endometriosis externa

Discussion

Endometriosis is the ectopic implantation of endometrial tissue to another location outside the uterine cavity. Several theories have been proposed for the pathophysiology of endometriosis.

It is accepted that the endometrial cells that are poured into the pelvis after retrograde menstruation constitute endometrial focus in the development of pelvic endometriosis.

There are many theories in the development of extrapelvic endometriosis. In the study conducted on experimental animals, the formation of endometrial foci after peritoneal or subcutaneous implantation of the endometrial tissue obtained during menstruation has produced important evidence (6)

Scar endometriosis occurs especially following operations related to the uterine cavity and the basal layer of the endometrium, such as caesarean section, myomectomy, hysterectomy, episiotomy as well as previous abdominal operations such as appendectomy, amniocentesis. It is adjacent to scar tissue in the majority of cases in the literature (7). In our cases, the endometrial foci were foundat the scar line or around 5 cm of the scar line. In the literatüre, there were also cases of abdominal wall endometriosis without a history of the previous operation. In rare cases, there may be an atypical presentation away from the scar line (8).

Anterior abdominal wall endometriosis is rarely seen. The palpable mass, pain in the cyclic menstrual period and the presence of obstetric or gynecological surgical operations in the anamnesis raise suspicion for the diagnosis of endometriosis. Differential diagnosis includes incisional hernia, abscess, granuloma, lipoma, dermoid tumors. Changes in the menstrual cycle and mass size are pathognomonic but may not be observed in all cases. In the anamnesis of the patients, it was seen that there was a painful mass in the incision line especially in the corner.

Leite et al. reported the occurrence of endometriosis at a rate of 0.03-3.5% after obstetric interventions (9). It was reported that 96% of the patients presented with mass, 87% with pain and 57% with symptoms related to the menstrual cycle. In our series, the mean age of the patients was 29.5 years, and anamnesis revealed a mean history of cesarean section 2.7 years (min: 1- max: 4) ago. A palpable mass was found in 57.1% (8 patients) and the pain was present in 100% (14 patients) of all patients. Diagnostic modalities such as USG, CT, MRI and doppler USG can be utilized. USG is the first and most preferred method in diagnosis because it is cheap and easily accessible (10). USG images typically display a hypoechoic mass with heterogeneous echoes.

When the imaging of our cases is reviewed, USG images were reported as ‘hyperechoic solid lesion (lipoma?)’ or ‘uniformly limited hypoechoic solid lesion (lymph node?)’ and CT images are reported as ‘hypodense solid lesion, lymph node? foreign body?’ The main treatment is surgical excision. When surgical excision of extrapelvic endometriosis is not possible, oral contraceptives, danazol or gonadotropin hormone secreting analogs are used in medical treatment. Medical menopause can be achieved in these patients. Symptoms may be regressed with these drugs, but their use is limited due to side effects such as osteoporosis in long-term use and recurrence of symptoms when treatment is discontinued (11). Surgical excision with surrounding intact tissue under spinal or local anesthesia was performed in our patients.

The definitive diagnosis of endometriosis is made by histopathological examination. Endometrial gland and stromal cells as well as hemosiderin-laden macrophages are observed in the examination (10). The diagnosis of endometriosis was confirmed as a result of the pathological evaluation of our cases.

Conclusion

In conclusion, endometriosis should be kept in mind especially in patients with a history of gynecological operation and a palpable mass around the incision site.

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References

1. Blanco RG, Parithivel VS, Shah AK, Gumbs MA, Schein M, Gerst PH. Abdominal Wall endometrioma. Am J Surg. 2003;185:596-8.

2. Mascaretti G, Di Berardino C, Mastrocola N, Patacchiola F. Endometriosis: rare localizations in two cases. Clin Exp Obstet Gynecol 2007;34:123-5.

3. Patterson GK, Winburn GB. Abdominal Wall endometriomas: report of eight cases. Am Surg 1999;65:36–9

4. Singh KK, Lessel M, Adam DJ, Jordan C, Miles WFA, Macintyre IMC, et al. Presentation of endometriozis to general surgeon: a 10 year experience. Br J Surg 1995;82:1349-51.

5. Al Shakarchi J, Bohra A. Endometrioma in a virgin abdomen masquerading as an intramuscular lipoma.Journal of surgical case reports 2015;3 :1-2

6. D Hooghe TM, Bambra CS, Isahaki M, Koninckx PR. Intrapelvic injection of menstrual endometrium causes endometriozis in baboons. Am J Obstet Gynecol 1995;173:125-34.

7. K. Chmaj-Wierzchowska, B Pieta, T Czerniak, T Opala. Endometriosis in a post-laparoscopic scar case report and literature review. Ginekologia Polska 2014;85:386–9.

8. Gajjar KB, Mahendru AA, Khaled MA. Caesarean scar endometriosis presenting as an acute abdomen: a case report and review literature. Arch Gynecol Obstet 2008;277:167-9.

9. GKC Leite, LFP De Carvalho, H Korkes, TF Guazzelli, G Kenj, ADT Viana. Scar endometrioma following obstetric surgical incisions: retrospective study on 33 cases and review of the literature,” Sao Paulo Medical Journal 2009;127:270–7.

10. Kshitij M, Gurjit S, Rishikesh K, Mackson N. Abdominal Wall endometriosis: a case report and review of literature. International Surgery Journal Manerikar Int S urg J 2016;3: 995-7.

11. Purvis RS, Tyring SK. Cutaneous and subcutaneous endometriosis. Surgical and hormonal therapy. J Dermatol Surg Oncol 1994;20:693-5.

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Inflammatory and oxidative alterations of water immersion and epidural analgesia during the labor

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Abstract

Objective: Water immersion and epidural analgesia are both pain relief methods used to perceive less pain during the labor process. There are concerns about the maternal and fetal outcomes, although studies presented no significant complication directly related to these methods. We aimed to compare the IL-1 and 6 levels, Total serum oxidant (TOS), antioxidant (TAS) and catalase levels of births with epidural analgesia, water immersion and conventional birth without analgesia.

Material and Methods: A total of 88 patients were included in the study (The water immersion group included 29 patients, while the epidural analgesia and control group included 30 and 29 patients respectively). Umblical cord IL-1, IL-6, catalase, TAS, TOS levels, neonatal Apgar scores, duration of birth process and demographic data were compared between three groups

Results: There was no significant difference between the three groups in terms of age, Body mass index (BMI), gravidity, parity, gestational week, and birth weight ($p>0.05$). TOS and IL-6 levels were significantly lower in epidural group than others ($p=0.031$, $p=0.019$ respectively). Apgar scores were significantly lower in epidural group ($p<0.001$).

Conclusion: The water immersion and epidural analgesia were found to have no adverse effect on oxidative status and infection parameters of women.

Key words: Analgesia, Epidural, Labor Pain, Interleukins, Oxidative stress, Waterbirth

Introduction

Increasing cesarean rates worldwide made popular noninterventional methods such as water immersion (1-3). There is a debate on the routine use of water during labor in the world due to the lack of sufficient data evaluating the potential risks and benefits of the method. American College of Obstetricians and Gynecologists (ACOG) recommended that water immersion during the first stage of labor could be offered to patients without obstetrical risk factors between 37+0 and 41+6 weeks of gestation (4). Still, birth should occur on the land, although there is no proven evidence that water birth had harmful obstetric effects (4). Water immersion during the delivery presents the positive birth experience, movement free environment, reduced need of pharmacologic pain relief methods, reduced stress on pelvic muscle and tissue to let the baby settle down the birth way quickly (5). Opponents of the process present the debate focusing on the concerns about the maternal and fetal infection risk (6). The risk of the previously used tube as a source of infection, the effect of warm water to provide the organisms suitable environment to live, the skin, vagina, and anal parts of a submerged woman are assumed to be the potential infection sources. However, studies advocate that there is no proven risk for maternal or fetal infection (7, 8).

Epidural analgesia is an effective, safe, and prevalent used pain management method during labor. The frequency of using epidural analgesia during labor became more popular in the world by years (9). Epidural analgesia defines injecting local anesthetics into the epidural space. The method presents effective pain relief, safe and satisfying labor progress and outcome, minimal maternal and fetal effects (9).

Complications related to drugs, the technique of an inexperienced person, or the effects of neuraxial analgesia are the drawbacks of the method (10). Hypotension, pruritus, unsufficient analgesia (failure of neuraxial analgesia), headache in case of accidental dural puncture, breastfeeding difficulties, nerve damage, epidural hematoma, and infection are the most frequent complications (11-15).

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Pregnancy is known to be a period characterized by increased oxidative stress due to the increased oxygen demand of the fetus and mother. However, it becomes more exaggerated by some of the pregnancy complications such as preeclampsia, preterm labor, and diabetes mellitus (16, 17). Labor is also known to be associated with increased oxidative stress due to the uterine contractions (18). Ischemia and reperfusion because of contractions are accused of increased oxidative stress (19). Several factors may affect the oxidative status of mother and fetus; however, studies show no difference in terms of oxidative stress between the modes of delivery (cesarean vs. vaginal) (20). These studies suggest that different mechanisms are altering oxidative status during labor. Catalase is one of the most important antioxidant defense enzymes. Increasing hydrogen peroxide results in decrease catalase levels (21). TOS, TAS levels are the other markers of oxidative balance (22).

Cytokines such as interleukin-1 (IL-1), and interleukin-6 (IL-6) are detected in the amniotic fluid during the healthy pregnancy (23). The level of these cytokines tends to increase during labor. However, the levels are determined much higher in case of infection (23).

In this prospective study, we aimed to compare the catalase status, TOS, TAS, IL-1, and IL-6 levels of the patients who labored with epidural analgesia, water immersion, and conventional birth.

Material and Methods

The study was conducted at XX University, XX hospital department of Obstetrics and Gynecology, antenatal clinic. The ethical committee has approved the study protocol (48/2018*). We collected the blood samples after taking written informed consent from the patients.

A total of 88 patients were included in the study. The water immersion group consisted of 29 patients, while the epidural analgesia and control group included 30 and 29 patients. The study is planned as a prospective study. Patients were selected randomly from the patients who requested for epidural analgesia or water immersion for pain relief and meet the following criterias to be included to the study: All of the participants were pregnant Turkish women with the term (between 37+0 and 41+0 gestational weeks), vertex presented, singleton pregnancies without identified obstetric risk factors. Exclusion criteria from the study are diagnosed physical or mental illness, multiple pregnancies, any kind of diagnosed disease and obstetric complication, drug use, smoking, membrane rupture more than 6 hours, any identified evidence of active infection (including active genital herpes and Human papillomavirus), active vaginal bleeding, previous uterine surgery, suspicion of the macrosomic fetus, pregnancies of assisted reproductive techniques and fetal distress. Demographic data and obstetric history were collected from the patient records.

The place for water immersion was the standard ovoid tube bath with filtered water at the temperature of 34-36 °C. The tub was cleaned with chlorine tablets for each patient. A culture was taken from the floor and walls of the bath after cleaning procedure. Every patient is allowed to enter the tub after getting a negative culture result. The water immersion group included 29 patients who were submerged during the first stage of labor when the labor was active. The active phase of the labor was defined as 6cm cervical dilatation with intense, regular uterine contractions. Labor was completed without labor induction, or any kind of analgesic drugs and birth occurred on the land. Vital signs and fetal heart rates were controlled at regular intervals. For the epidural group, an anesthetist performed epidural analgesia in charge of request and confirmation of the patients. Epidural analgesia was performed by using 100 mcg fentanyl and 10 mg Marcaine (5%). Repeat dose was administrated every one and a half hours if needed. The Control group consisted of the patients who had no pain relief method during labor. After the birth, cord blood about 5-10 cm3 was taken from the umbilical artery and centrifuged at 5000 r.p.m for ten minutes. Sera was transferred to Eppendorf tube to be stored at -80 °C until the time for analyses.

Assay for catalase: Catalase measurement was made by using the Human CAT (catalase) ELISA kit (Fine Test/Wuhan Fine Biotech Co., Ltd) at ELISA reader branded MRC UT6100. All the results were reported as pg/mL. Intra-assay and inter-assay Coefficient Variation (CV%)were <8% and <10% respectively.

Assay for IL-1 and IL-6: IL-1 and IL-6 measurement was made by using Human interleukin 1 Alpha (IL-1 alpha) and Human interleukin 6 (IL-6) ELISA kit (Fine Test/Wuhan Fine Biotech Co., Ltd) at ELISA reader branded MRC UT6100. All the results were reported as pg/mL. Intra-assay and inter-assay Coefficient Variation (CV%)were <8% and <10% respectively.

Assay for TAS and TOS: Total oxidant status (TOS) was measured spectrophotometric method by using the measurement kit of Rel Assay Diagnostic. Measurements were made with the Heales mb530 device, and all the results were reported as µmol/L. The normal range for human sera was reported as between 4.00 and 6.00 µmol/L. Intra-assay and inter-assay Coefficient Variation (CV%)were <3.9% and <3.2% respectively.

Total antioxidant status (TAS) was measured spectrophotometric method by using the measurement kit of Rel Assay Diagnostic. Measurements were made with the Heales mb530 device, and all the results were reported as mmol/L. The normal range for human sera was reported as between 1.20 and 1.50 mmol/L. Intra-assay and inter-assay Coefficient Variation (CV%)were <3.3% and <2.8% respectively.

Statistical Analysis

Data analysis was performed by using IBM SPSS Statistics version 17.0 software (IBM Corporation, Armonk, NY, USA). Whether the distributions of continuous variables were normally or not is determined by the Kolmogorov-Smirnov test. The Levene test examined the assumption of homogeneity of variances. Descriptive statistics for continuous variables were expressed as mean ± SD or median (25th – 75th) percentiles, where appropriate. A

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number of cases and percentages were used for nominal data. While the Kruskal Wallis test evaluated the continuous variables in which parametrical test assumptions were not met, otherwise, the mean differences among groups were compared by One-Way ANOVA. When the p-values from the Kruskal Wallis test or One-Way ANOVA were statistically significant, Dunn-Bonferroni or posthoc Tukey HSD test was used to know which group differs from which others. Nominal data were analyzed by Pearson's $\chi 2$ or Likelihood ratio test, where applicable. A p-value of less than 0.05 was considered statistically significant.

Results

Table 1 demonstrates the comparison of demographic, maternal, and fetal characteristics regarding groups. There was no significant difference between the three groups in terms of age, Body mass index (BMI), gravidity, parity, gestational week, and birth weight (p>0.05). Duration of 2nd phase, duration of 3rd phase, and delivery duration were not statistically different between three groups (p>0.05).

There was a statistically significant difference between the three groups in terms of 1st and 5th minutes APGAR scores. APGAR scores of the epidural group at 1st and 5th minutes were significantly lower than the water and control group (p<0.001 and p<0.001 respectively). There was no statistically significant difference between water and control groups (p>0.999) (Table 1).

The statistically significant difference between groups was found for the TOS level (p=0.031). The TOS level was found significantly lower in the epidural group than in the control group (p=0.044). No significant difference was found between water and epidural groups and water and control groups ((p>0.974 and p=0.077, respectively) (Table 2). The IL-6 level was found significantly different between the three groups (p=0.019). The difference was that the level of IL-6 was lower in the epidural group than in the control group (p=0.038). No significant difference was found between water and epidural groups and water and control groups ((p>0.999 and p=0.051, respectively) (Table 2). In the study, there was no significant difference between the three groups in terms of TAS, IL-1, and catalase levels (p>0.05) (Table 2).

Table 1: Demographical, maternal and fetal characteristics, and labor durations of groups

	Water (n=29)	Epidural (n=30)	Control (n=29)	p-value
Age (years)	28 (26-29)	27 (26-29)	27 (26-29)	0.710†
BMI (kg/m^2)	28.4 (24.5-31.2)	28.8 (26.0-30.6)	29.3 (27.6-33.5)	0.343†
Gravidity	2 (2-3)	2 (2-3)	2 (2-2)	0.698†
Parity	1 (1-1)	1 (1-2)	1 (1-1)	0.686†
Gestational week	38.0 (38.0-39.0)	39.0 (38.0-39.2)	38.0 (38.0-40.0)	0.899†
Birth weight (g)	3400 (3175-3600)	3375 (3150-3650)	3400 (3175-3625)	0.733†
1st min APGAR	8 (8-9)^a	7 (6-7)^{a,b}	9 (8-9)^b	**<0.001**†
5th min APGAR	10 (10-10)^a	8.5 (8-9)^{a,b}	10 (10-10)^b	**<0.001**†
Duration of 2nd phase	10.0 (6.0-10.0)	10.0 (5.0-10.0)	10.0 (7.0-12.5)	0.552†
Duration of 3rd phase	10.0 (8.0-10.0)	10.0 (8.75-10.0)	10.0 (8.5-10.0)	0.882†
Delivery duration	3.0 (2.1-4.5)	2.3 (1.9-4.0)	2.5 (2.0-3.7)	0.608†

While, the descriptive statistics were expressed as median (25th – 75th) percentiles for continuous variables, otherwise number of cases and (%) were used for nominal data, † Kruskal Wallis test, a: Water vs Epidural (p<0.001), b: Epidural vs Control (p<0.001).

Table 2: The results of biochemical measurements

	Water (n=29)	Epidural (n=30)	Control (n=29)	p-value
TAS	1.24 (0.86-1.66)	1.08 (0.86-1.38)	1.05 (0.85-1.57)	0.536†
TOS	4.89±0.48	4.86±0.55	5.20±0.59	**0.031**‡
CAT	0.15 (0.12-0.26)	0.13 (0.10-0.35)	0.17 (0.15-0.25)	0.091†
IL-1	4.07 (2.70-7.37)	4.58 (2.85-11.50)	5.48 (4.32-9.54)	0.163†
IL-6	9.07 (6.08-26.66)	8.87 (4.75-29.71)	13.32 (11.62-19.33)	**0.019**†

While the descriptive statistics for continuous variables which parametrical test assumptions were not met were expressed as median (25th – 75th) percentiles, otherwise mean ± SD were used. † Kruskal Wallis test, ‡ One-Way ANOVA

Discussion

This prospective study aimed to compare the oxidative markers (TAS, TOS, and catalase) and infection markers (IL-1 and IL-6) during the labor with water immersion, epidural anesthesia used as pain relief methods, and conventional labor without pain control. Results demonstrated that labor with epidural anesthesia and water immersion is associated with lower TOS and IL-6 levels compared to the control group. Duration of labor was not different between three groups.

According to the WHO reports, there is an increasing trend for cesarean sections worldwide (24). Turkey has the highest cesarean rate of any Organisation for Economic Co-operation and Development (OECD) country with 531.4/1000 live birth/per year (25). Patients' request due to the fear of labor pain is one of the most important preventable reason for increasing cesarean rate (26). Several pain relief methods are being studied to prevent the use of C-section that is performed to escape from labor pain (27).

The main goal of clinicians is to present a safe and painless birth experience to the patients. For this purpose, several pharmacological and non-pharmacological approaches were defined. Non-pharmacological methods for labor analgesia include massage, audio-therapy, hydrotherapy, acupuncture, acupressure, hypnosis, and transcutaneous electrical nerve stimulation (TENSE) (28). Pharmacologic methods consist of inhalation analgesia, opioids, and neuraxial analgesia (28). The advantages and drawbacks of these methods need to be well defined to ensure maternal and fetal safety. Cluett et al. published a comprehensive data of water immersion during the labor process in 2018 (8). The study did not show an impact of water immersion during the first stage of labor on maternal and neonatal adverse outcomes. Although there is a minor negative effect on birth mode and perineal tears, water immersion perceives less pain, and anesthesia requirement prominently decreases (8).

Studies are supporting the concerns about the increased risk of maternal and fetal infection during the water immersion (7, 29). The fecal contamination and the effect of warm water for microbial colonization are assumed as significant concerns. Thöni et al. demonstrated that labor water was contaminated with E.coli after the water immersion, although the infection rate did not increase (30). Legionella and Pseudomonas infection of newborns are also reported after the water immersion (31, 32). Fehervary et al. presented the study evaluating the microbial colonization after the water immersion, water birth, and conventional land birth. Maternal and neonatal infections were not different between groups, although the microorganisms of vaginal flora were present in the ear and palate of newborns (33). There was no significant difference between maternal and fetal infection rates with water immersion in the systemic review of Cluett et al. (8). Our data demonstrated that significant infection, fever, and NICU admission were not determined in all groups. The maternal temperature, leucocyte count, and CRP levels did not show a significant difference ($p>0.05$). IL-6 levels are significantly lower in water immersion and epidural groups than conventional land birth (epidural group<water immersion<control group).

The presentations of infection of neuraxial anesthesia are epidural abscess and meningitis. These complications are infrequent with an incidence of 3/100.000 (8). In our study population, there was no infection following epidural anesthesia. IL-6 levels are significantly lower in the epidural group than the water immersion and control group, while IL-1 levels are not significantly different.

The effect of water immersion on the oxidative status of mother and fetus is under debate in literature. Wilinska et al. demonstrated that oxidative status is not affected by the mode of delivery (34). However, Sert et al. demonstrated that cumulative oxidative stress is higher in the water immersion group than in the control group (35). We found that the TOS level is significantly lower than the control group suggesting that water immersion presents lower oxidative stress to mother and newborn than conventional birth. A few data are evaluating the effect of epidural anesthesia on the oxidative stress of mother and neonate. Compagnoni et al. assessed the level of coenzyme Q10 in a vaginal birth, spinal, and general anesthesia (36). Coenzyme Q10 is an antioxidant molecule and is found to be higher in spinal anesthesia than general anesthesia (36). Similarly, we found that the TOS level as an oxidative stress marker was the lowest in the epidural group. Our results supported that risk of adverse outcomes related to oxidative stress is low with epidural anesthesia.

The study of Leighton et al. evaluated the effect of epidural anesthesia on the neonatal outcome (37). The study showed that the method used for labor analgesia does not impact neonatal Apgar scores (37). Our study demonstrated that there was a statistically significant difference between the three groups in terms of 1st and 5th minutes APGAR scores. APGAR scores of the epidural group at 1st and 5th minutes were significantly lower than the water and control group. There was no statistically significant difference between water and control groups. The mean 1st and 5th minutes Apgar scores for the epidural group were 7 and 8.5, respectively. The decrease in Apgar score did not affect the NICU need and wellbeing of the newborns, although the difference was significant. There was no Apgar score of less than 6 in our study. Apgar scores of water immersion were not different from conventional birth, comparably the meta-analyze of Cluett et al. (8). The lower Apgar scores might be associated with the effect of fentanyl diffusing from epidural space to the maternal blood, placenta (38). Fentanyl might have adverse effects on neonatal respiratory system (38).

Conclusion

Water immersion and epidural anesthesia presented a chance for less painful labor to women and used all over the world. Our study is an essential contribution to the possible adverse effects of pain relief methods, water immersion, and epidural anesthesia. When used for labor pain control, the techniques seem to be safe in terms of oxidative results, infection, and neonatal outcomes.

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References

1. Henderson J, Burns EE, Regalia AL, Casarico G, Boulton MG, Smith LA. Labouring women who used a birthing pool in obstetric units in Italy: prospective observational study. BMC Pregnancy Childbirth. 2014;14:17.

2. Mackey MM. Use of water in labor and birth. Clinical obstetrics and gynecology. 2001;44(4):733-49.

3. Dahlen HG, Dowling H, Tracy M, Schmied V, Tracy S. Maternal and perinatal outcomes amongst low risk women giving birth in water compared to six birth positions on land. A descriptive cross sectional study in a birth centre over 12 years. Midwifery. 2013;29(7):759-64.

4. Committee on Obstetric P, American Academy of P. ACOG Committee Opinion no. 594: Immersion in water during labor and delivery. Obstet Gynecol. 2014;123(4):912-5.
5. Cooper M, Warland J. What are the benefits? Are they concerned? Women's experiences of water immersion for labor and birth. Midwifery. 2019;79:102541.
6. Bovbjerg ML, Cheyney M, Everson C. Maternal and Newborn Outcomes Following Waterbirth: The Midwives Alliance of North America Statistics Project, 2004 to 2009 Cohort. J Midwifery Womens Health. 2016;61(1):11-20.
7. Zanetti-Daellenbach RA, Tschudin S, Zhong XY, Holzgreve W, Lapaire O, Hosli I. Maternal and neonatal infections and obstetrical outcome in water birth. Eur J Obstet Gynecol Reprod Biol. 2007;134(1):37-43.
8. Cluett ER, Burns E, Cuthbert A. Immersion in water during labour and birth. Cochrane Database Syst Rev. 2018;5:CD000111.
9. Silva M, Halpern SH. Epidural analgesia for labor: Current techniques. Local Reg Anesth. 2010;3:143-53.
10. Leighton BL, Halpern SH. The effects of epidural analgesia on labor, maternal, and neonatal outcomes: a systematic review. Am J Obstet Gynecol. 2002;186(5 Suppl Nature):S69-77.
11. Ganesh A, Maxwell LG. Pathophysiology and management of opioid-induced pruritus. Drugs. 2007;67(16):2323-33.
12. Van de Velde M, Schepers R, Berends N, Vandermeersch E, De Buck F. Ten years of experience with accidental dural puncture and post-dural puncture headache in a tertiary obstetric anaesthesia department. Int J Obstet Anesth. 2008;17(4):329-35.
13. Torvaldsen S, Roberts CL, Simpson JM, Thompson JF, Ellwood DA. Intrapartum epidural analgesia and breastfeeding: a prospective cohort study. Int Breastfeed J. 2006;1:24.
14. Wong CA, Scavone BM, Dugan S, Smith JC, Prather H, Ganchiff JN, et al. Incidence of postpartum lumbosacral spine and lower extremity nerve injuries. Obstet Gynecol. 2003;101(2):279-88.
15. Reynolds F. Neurological infections after neuraxial anesthesia. Anesthesiol Clin. 2008;26(1):23-52, v.
16. Wisdom SJ, Wilson R, McKillop JH, Walker JJ. Antioxidant systems in normal pregnancy and in pregnancy-induced hypertension. Am J Obstet Gynecol. 1991;165(6 Pt 1):1701-4.
17. Zhu C, Yang H, Geng Q, Ma Q, Long Y, Zhou C, et al. Association of oxidative stress biomarkers with gestational diabetes mellitus in pregnant women: a case-control study. PLoS One. 2015;10(4):e0126490.
18. Yuan W, Lopez Bernal A. Cyclic AMP signalling pathways in the regulation of uterine relaxation. BMC Pregnancy Childbirth. 2007;7 Suppl 1:S10.
19. Hung TH, Chen SF, Hsieh TT, Lo LM, Li MJ, Yeh YL. The associations between labor and delivery mode and maternal and placental oxidative stress. Reprod Toxicol. 2011;31(2):144-50.
20. Fogel I, Pinchuk I, Kupferminc MJ, Lichtenberg D, Fainaru O. Oxidative stress in the fetal circulation does not depend on mode of delivery. Am J Obstet Gynecol. 2005;193(1):241-6.
21. Patil SB, Kodliwadmath MV, Kodliwadmath SM. Study of oxidative stress and enzymatic antioxidants in normal pregnancy. Indian J Clin Biochem. 2007;22(1):135-7.
22. Erel O. A new automated colorimetric method for measuring total oxidant status. Clin Biochem. 2005;38(12):1103-11.
23. Opsjln SL, Wathen NC, Tingulstad S, Wiedswang G, Sundan A, Waage A, et al. Tumor necrosis factor, interleukin-1, and interleukin-6 in normal human pregnancy. Am J Obstet Gynecol. 1993;169(2 Pt 1):397-404.
24. Betran AP, Torloni MR, Zhang JJ, Gulmezoglu AM, Section WHOWGoC. WHO Statement on Caesarean Section Rates. BJOG. 2016;123(5):667-70.
25. Elflein J. Cesarean sections in selected countries, OECD's Health at a Glance 2019 report 2019 [Available from: https://www.statista.com/statistics/283123/cesarean-sections-in-oecd-countries/].
26. Lori JR, Boyle JS. Cultural childbirth practices, beliefs, and traditions in postconflict Liberia. Health Care Women Int. 2011;32(6):454-73.
27. Tatar M, Gunalp S, Somunoglu S, Demirol A. Women's perceptions of caesarean section: reflections from a Turkish teaching hospital. Soc Sci Med. 2000;50(9):1227-33.
28. Wong CA. Advances in labor analgesia. Int J Womens Health. 2010;1:139-54.
29. Coombs R, Spiby H, Stewart P, Norman P. Water birth and infection in babies. BMJ. 1994;309(6961):1089.
30. Thoeni A, Zech N, Moroder L, Ploner F. Review of 1600 water births. Does water birth increase the risk of neonatal infection? J Matern Fetal Neonatal Med. 2005;17(5):357-61.
31. Vochem M, Vogt M, Doring G. Sepsis in a newborn due to Pseudomonas aeruginosa from a contaminated tub bath. N Engl J Med. 2001;345(5):378-9.
32. Nagai T, Sobajima H, Iwasa M, Tsuzuki T, Kura F, Amemura-Maekawa J, et al. Neonatal sudden death due to Legionella pneumonia associated with water birth in a domestic spa bath. J Clin Microbiol. 2003;41(5):2227-9.
33. Fehervary P, Lauinger-Lorsch E, Hof H, Melchert F, Bauer L, Zieger W. Water birth: microbiological colonisation of the newborn, neonatal and maternal infection rate in comparison to conventional bed deliveries. Arch Gynecol Obstet. 2004;270(1):6-9.
34. Wilinska M, Borszewska-Kornacka MK, Niemiec T, Jakiel G. Oxidative stress and total antioxidant status in term newborns and their mothers. Ann Agric Environ Med. 2015;22(4):736-40.
35. Sert UY, Ozel S, Neselioglu S, Erel O, Engin Ustun Y. Water Immersion During the Labour and Effects on Oxidative Stress. Fetal Pediatr Pathol. 2020;39(3):185-93.
36. Compagnoni G, Lista G, Giuffre B, Mosca F, Marini A. Coenzyme Q10 levels in maternal plasma and cord blood:correlations with mode of delivery. Biol Neonate. 2004;86(2):104-7.
37. Leighton BL, Halpern SH. The effects of epidural analgesia on labor, maternal, and neonatal outcomes: a systematic review. American journal of obstetrics and gynecology. 2002;186(5):S69-S77.
38. Ravelli ACJ, Eskes M, de Groot CJM, Abu-Hanna A, van der Post JAM. Intrapartum epidural analgesia and low Apgar score among singleton infants born at term: A propensity score matched study. Acta Obstet Gynecol Scand. 2020.

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Victimization from intimate partner rape in Uganda: Sex differences, psychological concomitants, and the effect of educational level

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Abstract

Objective: The aim of the study was to investigate victimization from intimate partner rape (IPR) in Uganda among both women and men, the effect of educational level, and psychological concomitants.

Method: A questionnaire was completed by 609 females and 420 males in Uganda. The mean age was 31.5 (SD 10.9) for females and 34.4 (SD 11.3) for males.

Results: Females reported significantly higher frequencies of victimization from IPR than males. Respondents with no education reported significantly higher frequencies of victimization than others. Respondents who had been more than average victimized from IPR scored significantly higher on depression and anxiety and had significantly lower self-esteem than others. Females who had been victimized more than average scored significantly lower on self-esteem than the other groups.

Conclusions: Not only females but also males were found to have been victimized from IPR. Victimization was linked to increased levels of negative psychological concomitants in both females and males.

Keywords: Victimization from intimate partner rape, sex differences, psychological concomitants, educational level, Uganda

Introduction

Intimate Partner Violence (IPV) refers to various, often overlapping, forms of abuse within an intimate relationship (1). The different types of abuse tend to occur simultaneously and this accentuates the burden placed on the victims (2). In a study carried out in northern Uganda, 78.5% of the participants reported having experienced some type of IPV during their lifetime (3). The lifetime prevalence rate of physical and/or sexual IPV among women in Africa has been estimated at 36.6%, which is higher than the global lifetime prevalence estimate of 30% (4). The aim of the present study was to investigate psychological concomitants and educational level related to intimate partner rape in Uganda.

It was not until the past few decades that intimate partner sexual violence (IPSV) started to gain academic attention (5, 6). IPSV exists along a wide continuum and involves a range of behaviours oscillating from violent sexual acts, such as sexual assault and forced penetration commonly referred to as intimate partner rape (IPR) (7), to cultural expectations and norms as for example forced marriages (8). IPR is the most common type of IPSV with the main defining feature being a lack of consent (7, 9).

Rozee (1993) (9) prefers to replace the term "lack of consent" with "lack of choice" when defining IPR, because tacit disapproval by the victim is incorporated in the latter.

Many African women are exposed to IPR early in their lives because they enter sexual relationships at a very early age (10). Many cultures in Africa still practice arranged marriages with women denied the right to choose their marriage partner, and girls are often married off in their teenage years to men many years their senior (11). Findings from a meta-analysis carried out in Southern African countries revealed that victimization from partner violence was highest among young women and teenage girls (12). In many rural areas of Uganda, entering marriage very young also denies the young girls a chance to attain a higher level of education and economic empowerment hence making them economically vulnerable (13). A study carried out in the rural areas of Uganda revealed that women who had attained a higher education level were less exposed to IPV (14).

Non-consensual sexual acts within marriage and long-term cohabitation are still considered uncharacteristic of most African cultures (15).

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In a study on women carried out in the Rakai district in Uganda, 30.0% reported having experienced IPSV (16). This is primarily because marriage and cohabitation establish a strong sexual relationship between the spouses which is often internalized as a sexual obligation (17, 18, 19). In a review of the marital rape literature, it was noted that marital rape is considered less serious when compared to stranger rape, because the victim may previously have engaged in several consented sexual acts with the perpetrator (20). In a recent study conducted in Uganda, both males and females, including those victimized, held accepting attitudes towards marital rape (21). Within many cultures in sub-Saharan Africa, being sexually unavailable to a spouse creates the potential for shame and self-blame, feelings of having failed to fulfill a marital duty (7). A spouse may even face consequences such as physical abuse, infidelity accusations, or loss of economic support if rejecting sexual advances from the partner (22). Additionally, the shame surrounding IPR may have an added facet in that victims may identify themselves as having failed in the eyes of society, because culture places great importance on marital duties (23). In many cultures in Africa, marriage is considered revered and society teaches children from an early age that finding a wife, or a husband is a fundamental life goal they should aspire for (17). Such cultural apprehensions tend to lay the groundwork for IPSV and sustain communities' tolerance of it, thereby decreasing the chance for a systemic social response (19). The line between a normal sexual encounter with a partner and intimate partner rape has been described as blurry. In a report on intimate partner rape, most of the interviewed women indicated that unconsented sexual acts, even when they fitted the legal definition of rape, were not considered as such by their partners (24).

The question of whether there is gender symmetry in the perpetration of IPV remains contentious (25). IPSV is, for instance, often presented as "violence against women", breeding the perception that males are always the aggressors and females always the victims (26). Due to this notion, the gender paradigm came into existence as male victims of IPV are often met with suspicion or disbelief (27). Findings from meta-analyses point to gender symmetry in the perpetration of IPV (28, 29, 30), and some researchers have suggested that women are as violent as men (31), and that most acts of IPV are normally bidirectional (32).

Research also refutes the idea that males do not suffer ill effects of intimate partner violence (33). Data indicates a great similarity in male and female victimization, as was the case in a huge national representative sample where the reactions of abused men were virtually identical to those of abused women (34). However, there are only a few studies that incorporate both men and women as victims or perpetrators of IPV in the same study (35).

Because IPSV is viewed as shameful and embarrassing, most cases go unreported, since victims fear being judged by friends, family, and society (19); yet suffering in silence increases the risk of continued exposure to not only IPSV but also physical and psychological violence perpetrated by intimate partners (24).

Victims of IPV experience psychological symptoms similar to those experienced by victims of other kinds of severe trauma (36). Such symptoms may include horror, shock, confusion, nightmares, helplessness, flashbacks, numbing, dissociation, and avoidance, as well as being extremely vigilant (37). Research also suggests that victims of IPV tend to get "sloppy" in their lives and are more likely to partake in health risk behaviors such as unprotected sex, drug use, smoking, and high alcohol consumption (38).

Although only a few studies have distinctively investigated the psychological effects of IPSV as opposed to psychological effects associated with IPV as a whole, IPSV appears to bear similar (39) or even more devastating (40) psychological consequences than a sexual assault by a stranger. Recent research has shown that intimate partner rape victims display similar or even worse psychiatric symptoms when compared to a stranger-rape victim (7).

Whereas anxiety is displayed instantly following a sexual assault (41), depression also sets in within a matter of a few hours (42), and according to some studies, symptoms of moderate to severe depression usually manifest in almost half of sexual assault cases and may last nearly three months (43, 42). Post-traumatic stress disorder (PTSD) develops in about half of the adults who have experienced sexual assault, and symptoms may linger on for a year or more (44, 45). Victims of sexual assault have also reported suffering from suicidal thoughts, sadness, and apathy (46).

Although the initial psychological symptoms experienced following IPSV may subside after three months (44), long-term symptoms such as emotional pain, sexual difficulties, problems in trusting partners in relationships, problems with self-esteem coupled with feeling "dirty", and other negative feelings about oneself, sleeping and eating disorders, flashbacks about the horrifying events, and residual fear tend to persist for several years in almost a quarter of the victims (47, 48, 19). The longer a person is exposed to severe IPSV, the greater the likelihood of experiencing severe depression and PTSD, as does the risk of an overlap of all the different types of abuses associated with IPV (49, 50).

For partners who are still in danger of being victimised, the trauma is ongoing, which puts victims at even greater risk for being isolated and controlled by their abusive partner (51). In such instances, some of the symptoms the victims develop may be survival strategies or an adaptive response to danger as explained by the trauma theory (52). Further still, victims of IPV may continue to experience the trauma even after leaving an abusive partner through stalking and re-traumatisation by e.g. legal prolonged custody or divorce hearings (51). Not all victims of IPSV develop psychiatric disorders, but it is important to note that almost all of them are affected in some way (53).

Research specific to gender differences in victimization from IPR and psychological concomitants in both females and males is extremely limited if any; hence the importance of the present study, which considers both women and men as potential victims of IPR.

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Methods

Sample: A questionnaire was completed by 609 females and 420 males in Uganda. The age range was between 16 and 94 years. The mean age was 31.5 (SD 10.9) for females, and 34.4 (SD 11.3) for males, the age differences was significant [t(1027) = 4.05, p < .001]. The educational level of the participants was as follows: no education (15.7%), primary school (16.0%), secondary school (26.1%), vocational school (11.4%), and university degree (30.5%).

Instrument: The questionnaire included a scale measuring frequency of victimization from intimate partner rape (adapted from Nakyazze, Österman & Björkqvist, 2018) (21). The scale was based on seven items and especially constructed for Uganda. The response alternatives were on a five-point scales (0 = never, 1 = seldom, 2 = sometimes, 3 = often, 4 = very often). Cronbach's Alpha for the scale was 0.93. The single items were as follows: Have you experienced the following from your present or previous partner?

a) Forced sex against your will when you were tired or ill,
b) Forced by a partner into unwanted sexual acts,
c) Forced sex after a physical assault,
d) A partner has put his/her arms around your neck trying to choke you in order to forcefully have sex with you,
e) A partner has raped you after giving you alcohol or drugs,
f) A partner has threatened to hurt you with an object or a weapon in order to have sex with you, and
g) A partner has raped you using an object.

Depression and anxiety were measured with two scales from the Brief Symptom Inventory (54). The response alternatives for both scales were on five-point scales (0 = not at all, 1 = a little, 2 = moderately, 3 = much, 4 = extremely much). Cronbach's Alphas for the scales were 0.96 and 0.97, respectively.

Self-esteem was measured with seven items from the Rosenberg Self-Esteem scale (55). The response alternatives were on five-point scales (0 = completely disagree, 1 = slightly disagree, 2 = neutral/undecided, 3 = slightly agree, 4 = completely agree). Cronbach's Alphas for the scale was 0.96.

Procedure: A paper questionnaire was constructed and made available for distribution to the participants from December 2018 to December 2019. Most of the participants came in as patients to a healthcare clinic in Kalerwe which is a residential slum in Kampala. The questionnaires were also hand-delivered to participants in different other urban and rural areas in Uganda.

Ethical considerations: The study adheres to the principles concerning human research ethics of the Declaration of Helsinki adopted by the World Medical Association (56), as well as guidelines for the responsible conduct of research of the Finnish Advisory Board on Research Integrity (2012) (57).

Results

Victimization from Intimate Partner Rape: Differences due to Sex and Educational Level

A two-way analysis of variance (ANOVA) was conducted with sex and educational level as independent variables, frequency of victimization from intimate partner rape as dependent variable, and age as covariate. There was a significant effect for sex [$F(1, 1012) = 152.33$, $p < 001$, $\eta p2 = 0.131$], education [$F(1, 1012) = 13.47$, $p < 001$, $\eta p2 = 0.051$], and the interaction between them [$F(4, 1012) = 8.58$, $p < 001$, $\eta p2 = 0.033$] (Fig 1). Females reported significantly higher frequencies of victimization from intimate partner rape than males.

Females were significantly more victimized than males on all educational levels (Fig. 1). In regard to the effect of educational level, respondents with no education reported significantly higher frequencies of victimization from intimate partner rape than respondents on all the other educational levels. The only significant difference between respondents on the other educational levels was that those with university degree reported less victimization than those with a secondary degree education. The tendency was, however, that the higher the educational level the less often the respondents had been victimized from intimate partner rape. The most common single behaviours that females were victimized from were forced sex against her will when she was tired or ill (m = 1.85), forced by a partner into unwanted sexual acts (m = 1.19), and forced sex after the physical assault (m = 1.10). The two most common single behaviours that males were victimized from where the same as for females, i.e. forced sex against his will when he was tired or ill (m = 0.80), and forced by a partner into unwanted sexual acts (m = 0.43). The third most common single behaviour for males was that a partner had put her arms around his neck trying to choke him in order to forcefully have sex with him (m = 0.22).

Psychological Concomitants of Intimate Partner Rape

Victimization from intimate partner rape was strongly correlated with depression, anxiety, and low self-esteem for both females and males (Table 1). The highest correlations were found for depression and anxiety in females.

A dichotomous variable was created for high vs. low victimization from intimate partner rape. A multivariate analysis of variance (MANOVA) was conducted with victimization from intimate partner rape (high/low), and sex as independent variables, three psychological concomitants as dependent variables, and age as covariate. The multivariate analysis was significant (Table 2, Fig. 2). The univariate analyses showed that respondents who had been more than average victimized from intimate partner rape scored significantly higher on depression and anxiety and had significantly lower self-esteem than others. Females reported significantly lower self-esteem than males. The interaction between high/low victimization from intimate partner rape and sex was significant only for self-esteem. Females who had been victimized more than average scored significantly lower on self-esteem than the other groups.

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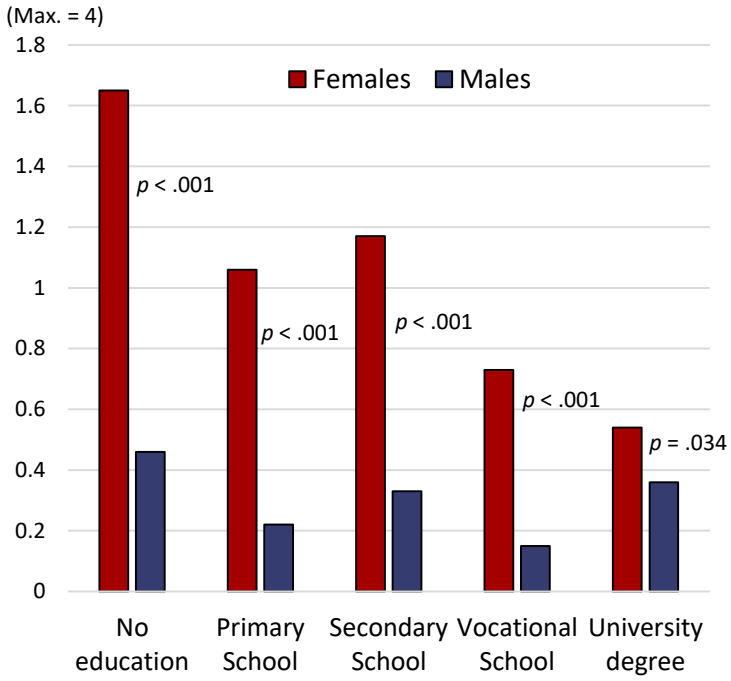

Figure 1: Mean values for victimization from intimate partner rape for females and males on different educational levels (N = 1029).

Table 1: Correlations between victimization from intimate partner rape and three psychological concomitants (N = 1029). (*** p < .001)

	Females	Males
Depression	0.70 ***	0.52 ***
Anxiety	0.67 ***	0.49 ***
Self-esteem	-0.58 ***	-0.30 ***

Table 2: Results of a multivariate analysis of variance (MANOVA) with the frequency of victimization from intimate partner rape (high/low), and sex, as independent variables, three psychological concomitants as dependent variables, and age as covariate (N = 1029). C.f. Fig. 2.

	F	*df*	$p \leq$	η_p^2
Age as covariate	4.85	3, 1013	.002	.014
Effect of Rape (High/Low)				
Multivariate Analysis	124.24	3, 1013	.001	.269
Univariate Analyses				
Depression	307.66	1, 1015	.001	.233
Anxiety	265.64	"	.001	.207
Self-esteem	200.33	"	.001	.165
Effect of Sex				
Multivariate Analysis	2.40	3, 1013	.066	.007
Univariate Analyses				
Depression	0.48	1, 1015	*ns*	.000
Anxiety	0.61	"	*ns*	.000
Self-esteem	6.60	"	.010	.006
Interaction Effect				
Multivariate Analysis	5.37	3, 1013	.001	.016
Univariate Analyses				
Depression	0.00	1, 1015	*ns*	.000
Anxiety	0.03	"	*ns*	.000
Self-esteem	13.33	"	.001	.013

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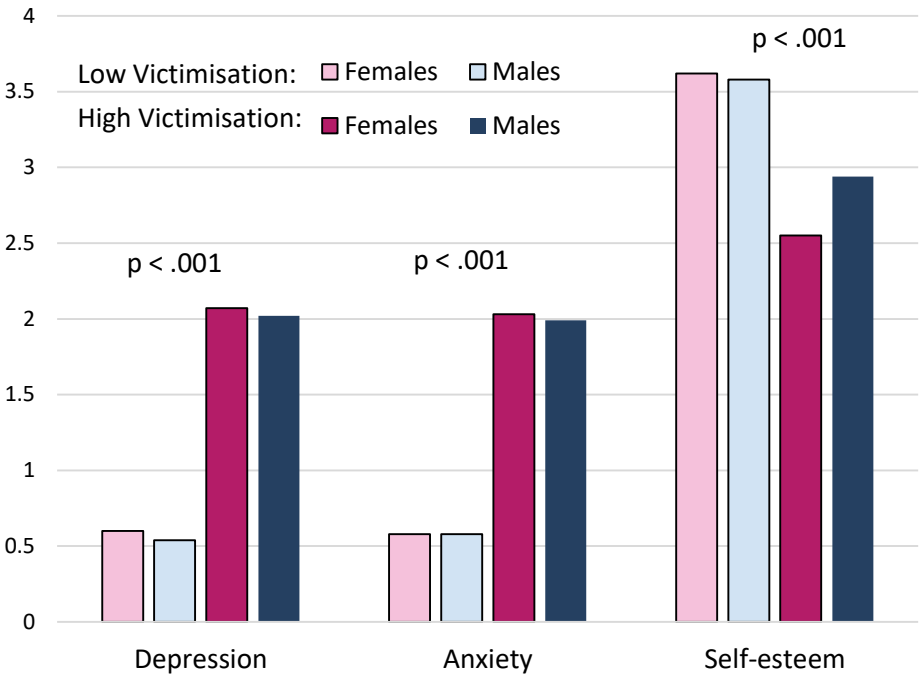

Figure 2: Mean values on depression, anxiety, and self-esteem for females and males with high/low victimization from intimate partner rape (N = 1029), c.f. Table 2.

Discussion

Sex differences: The results showed that females scored significantly higher than males on victimization from IPR. This finding can be interpreted against the context of beliefs relating to gender roles in marriage and family life in most African countries, including Uganda. The long-established patriarchal beliefs in most African countries have women seen as mere possessions owned by their fathers and later passed on to their husband through the practice of a dowry/bride price. Even in cohabitations and unofficial intimate relationships, a woman is required at all times to obey and submit to her partner who is considered the head of the family, and any action deemed demeaning or insubordinate towards her partner is firmly contested. Submission of women to men's hierarchical roles within sexual relationships extends to sexual acts, especially in marriage. Women are mainly expected to act passive during sexual encounters and it is considered offensive for a woman to decline an intimate partner's sexual advances (11). That may explain why many females in this study were victimized from forced unwanted sexual acts by an intimate partner, many reported having been forced into sexual acts when tired or ill, as well as forced sexual acts after a physical assault. Rape in Uganda is a crime but not within the bounds of marriage, as all intercourse within the marital context is considered consensual.

It is important to note that men also suffer when victimized from IPR at the hands of their female partners. The three most common types of victimization for males who participated in this study were from unwanted sexual acts, forced sex when tired or ill, and being choked by a partner in order to forcefully have sex. The large gender difference in victimization between males and females could partly be explained by the self-reporting of victimization. More women are open to disclosing victimization from IPR than men because men are afraid they may be viewed as weak and many people might have a hard time even believing that there could be such a thing as forcing a man into unwanted sexual acts.

Men are considered sexual beings and saying no to sexual advances may translate as having a low libido.

Psychological concomitants

Participants who had been more than average victimized from IPR scored significantly higher on depression and anxiety and had significantly lower self-esteem than others. Many victims of IPV do not leave their abusers especially in marriage or long-term cohabitation because in the Ugandan society, great importance is placed on family life and marriage; therefore, leaving a spouse is seen as a failure in life, and divorce is considered taboo. This traps the victims with no escape route.

The feeling of hopelessness and helplessness due to repetitive exposure to IPV will have the victims view themselves as worthless, hence lowering their self-esteem. The findings are corroborated by others; e.g. Ansara and Hindin (2011) (49) found that long-term exposure to IPV increases the victims' anxiety and depression, and will also have a significant impact on their sense of self.

Effect of educational level

Respondents with no education reported significantly higher frequencies of victimization than others. Education correlates with employment and empowerment, especially for women in Africa (13).

Gender inequality is widespread in most African countries, and girls' access to education falls below that of boys. In many cultures, girls are married off to older men against their will hence placing them in an unequal position intellectually as well as economically, and it is also known to increase the risk of victimization from IPV (11).

Cross-national comparisons reveal that countries with low social equality between the sexes generate more criminal victimization of women (10). In a study carried out on women in Uganda, women with a higher earning power through the employment advantage were less exposed to IPV because they can contribute financially to the running of their households and are therefore respected by their spouses, and there is somewhat shared decision making between the spouses (13).

Education also affects attitudes toward intimate partner abuse. Studies suggest that well-educated men with a high earning power, who are also urban dwellers, are less likely to endorse IPV (14). The less educated tend to have more accepting attitudes towards IPV (21). Although research has mostly concentrated on men's attitudes regarding IPV, women hold equally accepting attitudes (14).

Conclusions

The findings highlight that IPR occurs to both males and females, even though victimization is higher among females. The results of this study also suggest that there is an association between education and exposure to IPR, with low levels of education linked to an increased risk. Further still, victimization from IPR was linked to increased levels of negative psychological concomitants in both females and males. Finally, more research is needed on male victimization from IPR in Africa, because most of the available research on IPR focuses on male perpetrated IPR.

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Author Contributions: BN, KÖ, KB: Research concept and design; data collecting, analysis, and interpretation of data. BN, KÖ, KB: Preparation of article, revisions. All authors approved the final version of the manuscript.

Ethical issues: All authors declare originality and ethical approval of research. Responsibilities of research, responsibilities against local ethics commission are under the authors responsibilities. The study was conducted under defined rules by the local ethics commission guidelines and audits.

References

1 Campbell JC, Soeken KL. Forced sex and intimate partner violence: Effects on women's health. Viol Women 1999;5:1017–1035. doi:10.1177/10778019922181608

2 Weiss E, Gupta GR. Bridging the gap: Addressing gender and sexuality in HIV Prevention. Washington DC: International Center for Research on Women; 1998.

3 Black E, Worth H, Clarke S, Obol JH, Akera P, Awor A, Shabiti MS, Fry H, Richmond R. Prevalence and correlates of intimate partner violence against women in conflict affected northern Uganda: A cross-sectional study. Confl Health 2019;13:35. doi:10.1186/s13031-019-0219-8

4 World Health Organisation. Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence. Geneva, Switzerland: Department of Reproductive Health and Research; 2013.

5 Bidwell L, White P. The family context of marital rape. J Fam Viol 1986;1:277–287.

6 Drucker D. The common law does not support a marital exemption for forcible rape. Women's Rights Law Reporter 1979;5:2–3.

7 Bergen RK. Wife rape: Understanding the response of survivors and service providers. Thousand Oaks, CA: Sage; 1996.

8 Minturn L, Grosse M, Haider S. Cultural patterning of sexual beliefs and behavior. Ethnol 1969;8:301–318.

9 Rozee PD. Forbidden or forgiven? Rape in cross-cultural perspective. Psychol Women Q 1993;17:499–514.

10 Yodanis CL. Gender inequality, violence against women, and fear: A cross-national test of the feminist theory of violence against women. J Interpers Viol 2004;19:655–675. doi.org/10.1177/0886260504263868

11 Morrell R, Jewkes R, Lindegger G. Hegemonic masculinity/masculinities in South Africa: Culture, power, and gender politics. Men and Masculinities 2012;15:11–30. doi.org/10.1177/1097184X12438001

12 Decker MR, Latimore AD, Yasutake S, Haviland M, Ahmed S, Blum RW, et al. Gender-based violence against adolescent and young adult women in low- and middle-income countries. J Adolesc Health 2015;56:188–196. doi:10.1016/j.jadohealth.2014.09.003

13 Kwagala B, Wandera SO, Ndugga P, Kabagenyi A. Empowerment, partner's behaviours and intimate partner physical violence among married women in Uganda. BMC Public Health 2013;13:1112. doi:10.1186/1471-2458-13-1112

14 Koenig MA, Lutalo T, Zhao F, Nalugoda F, Wabwire-Mangen F, Kiwanuka N, et al. Domestic violence in rural Uganda: Evidence from a community-based study. Bulletin of the World Health Organization 2003;81:53–60.

15 García-Moreno C, Riecher-Rössler A. (Eds). Violence against women and mental health. Key Issues Ment Health 2013;178:1–11. doi.org/10.1159/000343777

16 Kouyoumdjian F, Calzavara L, Bondy S, O'Campo P, Serwadda D, Nalugoda F, et al. Risk factors for intimate partner violence in women in the Rakai community cohort study, Uganda, from 2000 to 2009. BMC Public Health 2013;13:566. doi:10.1186/1471-2458-13-566

17 Culbertson KA, Dehle C. Impact of sexual assault as a function of perpetrator type. J Interpers Viol 2001;16:992–1007. doi:10.1177/088626001016010002

18 Mahoney P, Williams LM. Sexual assault in marriage: Prevalence, consequences and treatment of wife rape. New Hampshire: Family Research Laboratory; 1998.

19 Russell DEH. Rape in marriage. Indianapolis, IN: Indiana University Press; 1990.

20 Bennice JA, Resick PA. Marital rape: History, research, and practice. Trauma Violence Abuse 2003;4:228–246.

21 Nakyazze B, Österman K, Björkqvist K. Sexual abuse and accepting attitudes towards intimate partner rape in Uganda. Medical Science and Discovery 2018;5:211–219. doi:10.17546/msd.422907

22 Heise L, Ellsberg M, Gottemoeller M. Ending violence against women. Population Reports 1999;Series L(11). https://www.vawnet.org/assoc_files_vawnet/populationreports.

23 Burt MR. Cultural myths and supports for rape. J Pers Soc Psychol 1980;38:217–230. doi:10.1037/0022-3514.38.2.217

24 Parkinson D. Raped by a partner: Nowhere to go; no-one to tell. Wangaratta, Victoria: Women's Health Goulburn North East; 2008.

25 Rennison CM, Welchans S. Intimate partner violence (Special report). Washington, DC: U.S. Bureau of Justice Statistics, National Institute of Justice; 2000.

26 Tjadens P, Thoennes N. Prevalence, incidence, and consequences of violence against women: Findings from the National Violence against Women Survey. Washington, DC: U.S. Department of Justice, National Institute of Justice, U.S. Department of Health and Human Services, and Centers for Disease Control and Prevention; 2000.

27 Straus M. Women's violence toward men is a serious social problem. In: Loseke DR, Gelles RJ, Cavanaugh MM (Eds.), Current controversies on family violence (pp. 55–78). Thousand Oaks, CA: SAGE Publications; 2005.

28 Archer J. Sex differences in aggression between heterosexual partners: A meta-analytic review. Psychological Bulletin 2000;126:651–680. doi:10.1037/0033-2909.126.5.651

29 Fiebert M. Annotated bibliography: References examining assaults by women on their spouses/partners. Sexuality and Culture 1997;1:273–286.

30 Straus MA. Thirty years of denying the evidence on gender symmetry in partner violence: Implications for prevention and treatment. Partner Abuse 2010;1:332–362. doi:10.1891/1946-6560.1.3.33210.

31 Straus MA, Gelles R, Steinmetz SK. Behind closed doors: Violence in the American family. New York: Doubleday/Anchor Books; 2006.

32 Straus MA, Ramirez IL. Gender symmetry in prevalence, severity, and chronicity of physical aggression against dating partners by university students in Mexico and USA. Aggress. Behav. 2007;33:281–290. doi:10.1002/ab.2019910.1002/ab.20199

33 Weiss KG. Male sexual victimization: Examining men's experiences of rape and sexual assault. Men and Masculinities 2010;12:275–298. doi.org/10.1177/1097184X08322632

34 Hines DA, Douglas EM. Women's use of intimate partner violence against men: Prevalence, implications, and consequences. J Aggress Maltreatment Trauma 2009;18:572–586. doi:10.1080/10926770903103099

35 Laroche D. Aspects of the context and consequences of domestic violence–Situational couple violence and intimate terrorism in Canada in 1999. Quebec, Canada: Institute de la Statistique; 2005.

36 Herman J. Trauma and recovery: The aftermath of violence – from domestic abuse to political terror. New York: Basic Books; 1992.

37 Crowell NA, Burgess AW. Prevention and intervention. In: Crowell NA, Burgess AW, Eds. Understanding violence against women. Washington, DC: National Academy Press; 1996. pp. 93–141.

38 Golding JM. Intimate partner violence as a risk factor for mental disorders: A meta-analysis. J Fam Viol 1999;14:99–132.

39 Golding JM, Siegel JM, Sorenson SB, Burnam MA, Stein JA. Social support sources following sexual assault. J. Community Psychol. 1989; 17:92–107.

40 Temple JR, Weston R, Rodriguez BF, Marshall LL. Differing effects of partner and nonpartner sexual assault on women's mental health. Violence Against Women. 2007;13:285–297.

41 Veronen LJ, Kilpatrick DG, Resick PA. Treatment of fear and anxiety in rape victims: Implications for the criminal justice system. In: Parsonage WH, editor. Perspectives on victimology. Beverly Hills, CA: Sage; 1979.

42 Resick PA. The psychological impact of rape. J Interpers Violence 1993;8:223–255. doi:10.1177/088626093008002005

43 Frank E, Stewart BD. Depressive symptoms in rape victims: A revisit. J Affect Disord 1984;7:77–85. doi.org/10.1016/0165-0327(84)90067-3

44 Rothbaum BO, Foa EB, Murdock T, Riggs DS, Walsh W. A prospective examination of post-traumatic stress disorder in rape victims. J Trauma Stress 1992;5:455–475.

45 Resick PA. Psychological effects of victimization: Implications for the criminal justice system. Crime & Delinqency 1987;33:468–478. doi:10.1177/0011128787033004004

46 Dickinson LM, deGruy FV 3rd, Dickinson WP, Candib LM. Health-related quality of life and symptom profiles of female survivors of sexual abuse. Arch Fam Med 1999;8:35–43. doi:10.1001/archfami.8.1.35

47 Frieze IH. Investigating the causes and consequences of marital rape. Signs 1983;8:532–553.

48 Kilpatrick DG, Veronen LJ. The aftermath of rape: A three-year follow-up. Paper presented at the World Congress of Behavior Therapy, 17th Annual Convention of the Association for the Advancement of Behavior Therapy; 1983 December; Washington, DC.

49 Ansara DL, Hindin MJ. Psychological consequences of intimate partner violence for women and men in Canada. J Interpers Violence 2011; 26:1628–1645. doi:10.1177/0886260510370600

50 Lindhorst T, Beadnell B. The long arc of recovery: Characterising intimate partner violence and its psychological effects across 17 years. Violence Against Women 2011;17: 480–499. doi:10.1177/1077801211404548

51 Van der Kolk BA, Roth S, Pelcovitz D, Sunday S, Spinazzola J. Disorders of extreme stress: The empirical foundation of a complex adaptation to trauma. J Trauma Stress 2005;18:389–399. doi:10.1002/jts.20047

52 Testa M, Leonard KE. The impact of marital aggression on women's psychological and marital functioning in a newlywed sample. J Fam Violence 2001;12:115–130.

53 Resick PA. Reactions of female and male victims of rape or robbery. Final report. Washington, DC: National Institute of Justice; 1988.

54 Derogatis LR. Brief Symptom Inventory. Baltimore, MD: Clinical Psychometric Research; 1975.

55 Rosenberg M. Society and the adolescent self-image. Princeton, NJ: Princeton University Press; 1965.

56 World Medical Association. World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. Bulletin of the World Health Organization 2013;79:373–374.

57 Finnish Advisory Board on Research Integrity. Responsible conduct of research and procedures for handling allegations of misconduct in Finland. Helsinki: Finnish Advisory Board on Research Integrity; 2012.

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Conditions affecting postpartum depression in the Covid-19 pandemic

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Abstract

Objective: Covid-19 infection was first diagnosed in Wuhan, China, and became a pandemic. Afterward, it had a devastating effect on mental and physical health. Postpartum depression (PPD) is a common health problem that needs attention to improve women's healthcare. Herein, we aim to search for the PPD incidence in the pandemic period.

Methods: A prospective cross-sectional study was conducted. A total of 126 pregnant women were included for the study. None of the patients had Covid-19 infection. Inclusion criteria included; women were aged 18 or over and ability to communicate fluently provided informed consent to participate. Women who had late fetal loss and stillbirth or neonatal death were excluded. Patients age, gravida, medical history, previous or ongoing psychological disease, and drug use, alcohol use and smoking, obstetric follow-up regarding any complication for the fetus or mother, socio-economic status, spouse support, sleep disorder, hyperemesis gravidarum, type of delivery, fetal birth weight, height, AGGAR scores 1-5th min, neonatal intensive care unit (NICU) admissions were recorded. Postpartum depression diagnosis was evaluated via Edinburgh Postpartum Depression Scale (EPDS). Patients were grouped into two, group 1 consisted of patients who are at low risk for postpartum depression and group 2 was at high risk for depression according to their EPDS scores.

Results: The mean age of the patients was 28.90±5.26 (18-41). 68 (54%) of the patients had vaginal deliveries and 58 (46%) of them had cesarean section. The average weight of newborn babies was 3324±586.11 grams (2750-4950), 1st minute APGAR score was 7.75±0.9 (4-8), 5th minute APGAR score was 8.88±0.45 (7-9). 23 (18.3%) of the newborns were admitted to neonatal intensive care (Table 1). According to the EDPS scores, only 12% of the patients were classified as having high risk group for depression. Lower income, previous psychiatric illness, higher education levels and having newborn needs NICU were found to significantly related to PPD ($p = 0.029$, $p = 0.034$, $p=0.046$ and $p = 0.001$ respectively) (Table 2). The other parameters were not found to be significantly related to PPD scores.

Conclusion: Covid-19 was not found to increase the rate of PPD in short term notice in our center, which was affected seriously. Studies with a higher number of patients and in different regions are necessary to state a precise conclusion.

Keywords: Covid-19, postpartum depression, fetal outcome, newborn, pregnancy, pregnancy outcome

Introduction

The Covid-19 pandemic caused the development of many negative psychological effects on people on all over the world. These effects include fear, stress, panic, paranoia, mental health disorders, anxiety, depression, impaired quality of life, sleep disorders and insomnia (1-4). Li wen et al recommended that social programs and plans should be made in order to reduce outbreak-related stress disorders (2).

Precautions and practices have been taken into reduce/stop the transmission of the virus between people, restriction of social events, and even curfews in most countries. These restrictions have different problematic psychological effects among people. These negative effects were found to more common in patients with Covid-19 and psychiatric disorders, suspected to have Covid-19, in women, elderly people and young aged population (12-21 ages) (5-7). Also, healthcare professionals, especially doctors and nurses were seriously affected psychologically during the outbreak. Identifying the groups affected by the negative process and their degree of the effect is important in determining the actions to be taken for management and to prevent future complications (8,9).

Experiencing stressful life events during pregnancy or the early postpartum period is known to be related to postpartum depression. The prevalence rate of postpartum depression was found to be about 10% (10,11). Diagnosing postpartum women with depression is essential as untreated postpartum depression may cause devastating outcomes.

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The American College of Obstetricians and Gynecologists recommends that obstetrician-gynecologists and other obstetric care providers should screen all the pregnant women at least one time during pregnancy and postpartum period using a standardized and validated tool (11,12).

As Covid-19 is a stressful event for every people, we had conducted a research in order to measure the postpartum depression rate in our clinic to decide the appropriate management of the postpartum women.

Materials and Methods

A prospective cross-sectional study was planned to evaluate the women with the Edinburgh questionnaire in terms of postpartum depression who gave birth in our hospital until the start of the normalization process of pandemics. For this purpose, a sample of 126 pregnant women who delivered between 15 March and 15 May 2020 were included in the study. All pregnant Turkish-speaking women who delivered in our clinic approached and invited to participate in this study. Inclusion criteria were that women were aged 18 or over and the ability to communicate fluently provided informed consent to participate. Women who had late fetal loss and stillbirth or neonatal death were excluded. Due to the incomplete questionnaires and complicated pregnancies, 26 (20.6%) of the patients were excluded from the study. The sociodemographic characteristics, maternal and fetal outcome information of the patients were recorded from the hospital database. Ethics committee approval was taken from the local ethics committee of the Health Sciences University Kartal Dr. Lutfi Kırdar Training and Research Hospital and the Ministry of health. (Ethics committee approval number: 2020-0512T14-07-12)

Patients age, gravida, medical history, previous or ongoing psychological disease, and drug use, alcohol use and smoking, obstetric follow-up regarding any complication for the fetus or mother, socio-economic status, spouse support, sleep disorder, hyperemesis gravidarum, type of delivery, fetal birth weight, height, APGAR scores 1-5th min, neonatal intensive care unit (NICU) admissions were recorded. Postpartum depression possibility was evaluated via Edinburgh Postpartum Depression Scale (EPDS). This questionnaire was applied to the patients after one month from delivery, and it was questioned by medical staff. t is a 10-item questionnaire that is easy to apply and considered as an effective tool for depression screening (12,13). This scale is used to define the risk of depression in women in the postpartum period. (14) Adaptation of the EPDS scale to Turkish, validity, and reliability studies were carried out in 1997 and it became a frequently preferred test in the clinic (15-16). It measures the psychological state of the individual in the last 7 days. Each item is rated on a four-point Likert scale between 0 and 3 ("Yes, always," "Yes, almost time," "No, not very often" and "No, not at all." The total score ranges from 0 to 30. EPDS threshold Women 12 and older may be considered as possible PPD. (17-18)

The SPSS 20.0 software (IBM Corp. Released in 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) was used to analyze the study data. Data were presented as mean ± standard deviation, median (minimum-maximum), percentages, and frequency of variables. Normality and homogeneity of variances were prerequisites to analyze variables using the Shapiro-Wilk and Levene tests. In the analysis of data, the independent Samples t- test (Student's t-test) was used in comparisons between two independent groups, if prerequisites were met, and the Mann-Whitney U test was used if prerequisites were not met. Fisher's exact test and the chi-square test was used to analyze categorical data. When the expected frequencies were less than 20%, the Monte Carlo simulation method was used to include these frequencies in the analysis. The statistical significance level for these tests was set at p values of <0.05 and <0.01.

Results

The mean age of the patients was 29.01±5.43 (18-41), mean body mass index 27.4±2.34 (21.4- 33.8), mean gravida 2.67±1.42 (1–7), parity 2.16±1.05 (1-5), number of living babies 2.09±0.98 (1- 5), the gestational week was 38.68±1.82 (30-42), the weight gained during pregnancy was 11.96± 4.38 kg (2-28), and the mean of the day of puerperium at questionnaire application was 2.51±1.73 days (0-6). Patients' mode of delivery was the cesarean section in 58 (46%) of the patients and vaginal delivery in 68 (54%) of the patients. The average weight of newborn babies was 3324±586.11 grams (2750-4950), 1st minute APGAR score was 7.75±0.9 (4-8), 5th minute APGAR score was 8.88±0.45 (7-9). 23 (18.3%) of the newborns were admitted to neonatal intensive care. 89 patients (70.6%) reported sleep disorders whereas 37 (29.4%) of them did not have sleep disorders. 105 (83.3%) had stated that they had spouse support. Most of the patients, 114 (90%), were not smoking cigarettes. None of the patients were using alcohol. Chronic disease history

32 (25.1%) of the patients reported previous chronic disease history and 56 (45%) of them had previous surgery history. 98 (98%) of the patients had uncomplicated pregnancies. Socio-demographic and obstetric features of the study population were summarized in Table 1.

According to the EDPS scores, only 12% of the patients were classified as high risk for depression. Patients were grouped into two, group 1 is described as patients with low risk for postpartum depression, and group 2 has consisted of patients with high risk for depression. Sociodemographic characteristics and maternal and fetal obstetrics features were compared between groups. Patients with low income had a higher risk for depression comparing patients with higher income ($p = 0.029$). Also, patients with a previous psychiatric illness before pregnancy had significantly higher risk for PPD than patients without history ($p = 0.034$). Patients whose babies needed NICU were also classified at high risk for PPD ($p = 0.001$) comparing patients without fetal complications. Patients with higher education levels had significantly more risk for PPD than patients with low education levels ($p=0.036$). Patients having babies with more weight were found to be significantly at low-risk for PPD ($p=0.046$). The other parameters were found to be significantly related to PPD scores. Comparison of the patients with high and low risk for PPD regarding the socio-demographic and obstetric factors were summarized in Table 2.

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Table 1. Socio-demographic characteristics and medical history of the study population

	Mean±SD	(maximum-minimum)
Age (years)	29.01± 5.43	18-41
BMI (kg/m^2)	27.4±2.34	21.4- 33.8
Gravida	2.67± 1.42	1–7
Parity	2.16± 1.05	5-Jan
Baby alive	2.09± 0.98	5-Jan
Gestational age (weeks)	38.68± 1.82	30-42
Weight gain in pregnancy (kg)	11.96± 4.38	28-Feb
Time passing after birth (days)	2.51±1.26	0-6
Newborn weight (grams)	3324± 586.11	2750-4950
APGAR score 1st minute	7.75± 0.90	8-Apr
APGAR score 5th minute	8.88± 0.45	9-Jul
Mode of delivery	n, (%)	
Vaginal delivery	58 (46 %)	
Caserean section	68 (54 %)	
Sleep disorders		
Absent	89 (70.6%)	
Present	37 (29.4 %)	
Spouse support		
Absent	21 (16.7 %)	
Present	105 (83.3%)	
Cigarette smoking		
Smoker	12 (9.5%)	
Non-smoker	114 (90.5%)	
Chronic disease history		
Present	32 (25.1 %)	
Absent	94 (74.6%)	
Previous psychiatric illness		
Present	3 (2.4 %)	
Absent	123 (97.6 %)	
Income status		
Low income	77 (61.1%)	
Middle income	33 (26.2%)	
High income	16 (12.7%)	
Education status		
Primary school	40 (31.8%)	
Middle school	37 (29.4%)	
High school	25 (19.8 %)	
University	24 (19 %)	
NICU admission		
Present	23 (18.3%)	
Absent	103 (81.7%)	

Table 2. Comparison of high risk and low-risk patients for PPD regarding predisposing factors

	High risk patients for PPD (n= 36)	Low risk patients for PPD (n= 90)	p
Sleep disorder present	12 (9.5%)	25 (19.8%)	0.536
Spouse support absent	6 (4.8%)	15 (11.9%)	1
Smoking	6 (4.8%)	6 (4.8%)	0.84
Chronic disease history	9 (7.1%)	23 (18.3%)	0.948
Income status	Low 18 (14.3%) Middle 24 (19%) High 7 (5.6%)	59 (46.8 %) 9 (7.1%) 9(7.1%)	**0.029**
Education status	Primary 18 (14.3%) High 6 (4.8%) University 12 (9.5%)	59 (46.8%) 19 (15.1%) 12 (9.5)	**0.036**
Primary school	18 (14.3%)	59 (46.8%)	
Mode of delivery	Cesarean delivery 18(14.3%) Vaginal delivery 18 (14.3%)	40 (31.7%) 50 (39.7%)	0.572
NICU admission	Present 6 (4.8%) Absent 30 (23.8%)	17 (13.5%) 73 (57.9%)	**0.001**
Previous psychiatric illness	Present 3(2.4%) Absent. 33(26.2%)	0 (0%) 90 (71.4%)	**0.006**
Maternal complications during pregnancy	Present 3 (2.4%) Absent 33 (26.2%)	7 (5.6%) 83 (71.6%)	0.585
Age (years)	28.92±4.21	28.9±5.64	0.987
BMI (kg /m^2)	28.1±1.42	27.1±1.65	0.117
Gestational week at birth	38.08±2.32	38.77±1.71	0.072
Fetal birth weight (grams)	3125±431.90	3346±598.40	**0.046**
APGAR score 1th min	7.67±1.12	7.72± 0.94	0.779
APGAR score 1th min	8.83±0.56	8.87±0.48	0.766

Discussion

The first Covid-19 case was diagnosed on March 10, 2020, in our country. Afterwards, a rapid increase was observed and became the 7th country with the highest number of cases. The highest number of cases were diagnosed in Istanbul, the largest and most crowded city in the country. Our hospital was quickly organized as a pandemic hospital by the Ministry of Health after the first case was seen. Therefore, it is one of the most experienced center in pandemics regarding the highest number of treated covid-19 patients. Although elective surgeries were stopped in gynecology, maternity follow-up and birth processes continued without interruption during this period. From March 10 to May 15, the pandemic spread rapidly in our country and serious measures were taken.

Pandemics negatively affected the psychological condition of the entire world population (1). In the study conducted by Rajkumar et al, anxiety and depression rates were reported to be between 16 and 28% to the Covid-19 pandemics (1-2). Huang and his friends stated that public awareness of the pandemic was low in China and there was no targeted psychological instruction needed in the pandemic period. For this reason, they stated that the psychological state of the society should be routinely monitored during the life-threatening pandemics. Thus, early mental health interventions will be established in the early period of pandemics (20). In studies investigating the effect of the pandemic on anxiety, depression, and quality of life in the world, it was found that different groups are affected in different degrees (16-21). For this reason, it is proposed to plan management approaches for the ones who have a high risk for psychological disorders (11,13,15,20).

The incidence of PPD ranges from 10 to 20% today. Many factors affect incidence. Many social, personal, cultural factors even different periods of time could affect the incidence of PPD (23,24). While PPD prevalence is 9.6% in countries with high per capita income, this rate rises to 19.6% in low and middle-income countries (24,25).

Sliwerski et al conducted a study in China in 2018 before pandemic, the incidence of PPD was found to be 17.2%. There are studies that show an increase in depression in the community during the pandemic period, but there is no study related to PPD rates in the literature (24).

Uncomplicated pregnancy period is essential for the mental and physical health of the baby and the mother. In our study, the complicated pregnancy rate was low so our results were not confounded with the related psychological stress of chronic illness. (25-26) As we are searching for the effect of Covid-19 this could make our result more relevant to Covid-19 pandemic. Also, previous studies showed that psychiatric illness is a risk factor for PPD. We also found that patients with a history of the psychiatric disease are at high risk for PPD than the others (27,28). We can argue that this situation is also acceptable in pandemics. PPD was found to be related to low socioeconomic status similar to our study (27). Socio-economic was defined as both supportive and preventive factors for PPD. The precise effect remains controversial (28).

Health problems of the newborn were shown to increase the risk of PPD in the literature in accordance with our results (29,30). Also, disabled newborn was found to be a reason for maternal depression (29,30). Moreover, we found that the low weight of the newborn is associated with PPD. As far as we know this is not mentioned in the literature before. Studies with high number of patients could be done to justify this relationship.

In our hospital, 12% of women who gave birth during this period were found to be at high risk for PPD. This result is compatible with the previous research before pandemics in our country 12.9% (30). Based on this, the unlike the general population, pandemics seem to be not related to an increase in postpartum depression rates during the initial and rapid spreading periods of pandemics. Our population could be classified as low-risk population for PPD, so effects of Covid-19 could not be misjudged due to the confounding factors. It is thought that the most important factor that prevents postpartum women could be related to mother-baby attachment.

Conclusion

We observed that the Covid-19 pandemic did not increase the incidence of postpartum depression. The increase in depression and anxiety which seen in the general community was not seen in postpartum patients. Study population mostly consisted of patients with a good mental health.

There were no additional risk factors for psychological illness in most of the patients. Also feeling of gratitude for having a healthy baby in pandemics may improve the postpartum well-being. Mother-infant attachment could also play a supportive role in maternal psychology. There was a significant increase in risk for PPD, especially, in pregnant women with psychiatric conditions and in those who developed maternal, fetal, or neonatal complications during pregnancy. Furthermore studies with high number of patients with more centers would enable us to come to a precise conclusion about the Covid-19 pandemic effect on postpartum depression.

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References

1 Lima, C.K.T., Carvalho, P.M.M., Lima, I.A.A.S., Nunes, J.V.A.O., Saraiva, J.S., de Souza, R.I., et al. The emotional impact of Coronavirus 2019-nCoV (new coronavirus disease). Psychiatry Res. 2020; 287: 112915. (Epub ahead of print)

2 Lei L, Huang X, Zhang S, Yang J, Yang L, Xu M. Comparison of Prevalence and Associated Factors of Anxiety and Depression Among People Affected by versus People Unaffected by Quarantine During the COVID-19 Epidemic in Southwestern China. Med Sci Monit. 2020;26:e924609. Published 2020 Apr 26. doi: 10. 12659/MSM.924609.

3 Hao F, Tan W, Jiang L, et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry (published online ahead of print, 2020 Apr 27). Brain Behav Immun. 2020;S0889-1591(20)30626-7. doi:10.1016/j.bbi.2020.04.069

4 Li W, Yang Y, Liu ZH, et al. Progression of Mental Health Services during the COVID-19 Outbreak in China. Int J Biol Sci. 2020;16(10):1732-1738. Published 2020 Mar 15. doi:10.7150/ijbs.45120

5 Wang C, Pan R, Wan X, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China (published online ahead of print, 2020 Apr 13). Brain Behav Immun. 2020;S0889-1591(20)30511-0. doi:10.1016/j.bbi.2020.04.028

6 Liu, N., Zhang, F., Wei, C., Jia, Y., Shang, Z., Sun, L., et al. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. Psychiatry Research. 2020; 287: 112921. https:// doi.org/ 10.1016/ j.psychres.2020.112921

7 Chew, N., Lee, L.G., Tan, B.Y., Jing, M., Goh, Y., Ngiam, N., et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. Brain Behav. 2020. Immun.

8 Mukhtar, S. Mental health and emotional impact of COVID-19: applying health belief model for medical staff to general public of Pakistan. Brain Behav. Immun. 2020. https://doi.org/10.1016/j.bbi.2020.04.012.

9 Shi, Y., Wang, J., Yang, Y., Wang, Z., Wang, G., Hashimoto, K., et al. Knowledge and attitudes of medical staff in Chinese psychiatric hospitals regarding COVID-19. Brain Behav. Immun. Health 4. 2020: 100064. https:// doi.org/ 10.1016/ j.bbih.2020. 100064.

10 Tan, B.Y.Q., Chew, N.W.S., Lee, G.K.H., Jing, M., Goh, Y., Yeo, L.L.L., et al. Psychological impact of the COVID-19 pandemic on health care workers in Singapore. Ann. Intern. Med. 2020a. https://doi.org/10.7326/m20-1083.

11 Rajkumar RP. COVID-19 and mental health: A review of the existing literature (published online ahead of print, 2020 Apr 10). Asian J Psychiatr. 2020;52:102066. doi:10.1016/j.ajp.2020.102066

12 ACOG Committee Opinion No. 757: Screening for Perinatal Depression. Obstet Gynecol. 2018;132(5):e208-e212. doi:10.1097/AOG.0000000000002927

13 Turkcapar AF, Kadıoğlu N, Aslan E, Tunc S, Zayıfoğlu M, Mollamahmutoğlu L. Sociodemographic and clinical features of postpartum depression among Turkish women: a prospective study. BMC Pregnancy Childbirth. 2015;15:108. Published 2015 May 3. doi:10.1186/s12884-015-0532-1

14 Slavin V, Creedy DK, Gamble J. Comparison of screening accuracy of the Patient Health Questionnaire-2 using two case-identification methods during pregnancy and postpartum. BMC Pregnancy Childbirth. 2020;20(1):211. Published 2020 Apr 14. doi:10.1186/s12884-020-02891.

15 Cox JL, Holden JM, Sagousky R. Detection of postpartum depression. Development of the 10 item Edinburgh postpartum depression scale. Br J Psychiatr. 1987;150:782-786.

16 Unsal Atan Ş, Ozturk R, Gulec Satir D, et al. Relation between mothers' types of labor, birth interventions, birth experiences and postpartum depression: A multicentre follow-up study. Sex Reprod Healthc. 2018;18:13-18. doi:10.1016/j.srhc.2018.08.001

17 Oztora S, Arslan A, Caylan A, Dagdeviren HN. Postpartum depression and affecting factors in primary care. Niger J Clin Pract. 2019;22(1):85-91. doi:10.4103/njcp.njcp_193_17

18 Liberto TL. Screening for depression and help-seeking in postpartum women during well-baby pediatric visits: an integrated review. J Pediatr Health Care. 2012;26(2):109-117. doi:10.1016/j.pedhc.2010.06.012

19 Qiu, J., Shen, B., Zhao, M., Wang, Z., Xie, B., & Xu, Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. General Psychiatry. 2020: 33(2), Article e100213. https:// doi.org/ 10.1136/ gpsych-2020-100213

20 Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry Res. 2020;288:112954. doi:10.1016/j.psychres.2020.112954

21 Li Q, Yang S, Xie M, et al. Impact of some social and clinical factors on the development of postpartum depression in Chinese women. BMC Pregnancy Childbirth. 2020;20(1):226. Published 2020 Apr 16. doi:10.1186/s12884-020-02906-y

22 Gaynes BN, Gavin N, Meltzer-Brody S, Lohr KN, Swinson T, Cartlehner G, Brody S, Miller WC. Perinatal depression: prevalence, screening accuracy, and screening outcomes. Evid Rep Technol Assess (Summ). 2005;119:1–8.

23 Gelaye, B.; Rondon, M.B.; Araya, R.; Williams, M.A. Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. Lancet Psychiatry 2016, 3, 973–982.

24 Śliwerski A, Kossakowska K, Jarecka K, Świtalska J, Bielawska-Batorowicz E. The Effect of Maternal Depression on Infant Attachment: A Systematic Review. Int J Environ Res Public Health. 2020;17(8):E2675. Published 2020 Apr 14. doi:10.3390/ijerph17082675 Parsons CE, Young KS, Rochat TJ, Kringelbach ML,

25 Stein A. Postnatal depression and its effects on child development: a review of evidence from low-and middle-income countries. Br Med Bull. 2011; 101: 57-79.

26 Helle N, Barkmann C, Bartz-Seel J, et al. Very low birth-weight as a risk factor for postpartum depression four to six weeks postbirth in mothers and fathers: Crosssectional results from a controlled multicentre cohort study. J Affect Disord. 2015; 180: 154-161.

27 O'Hara MW, McCabe JE. Postpartum depression: current status and future directions. Annu Rev Clin Psychol. 2013; 9: 379-407.

28 Eastwood JG, Jalaludin BB, Kemp LA, Phung HN, Barnett BE. Relationship of postnatal depressive symptoms to infant temperament, maternal expectations, social support and other potential risk factors: findings from a large Australian cross-sectional study. BMC Pregnancy and Childbirth. 2012; 12: 1-11.

29 Danaci AE, Dinc¸ G, Deveci A, S. Postnatal depression in Turkey: epidemiological and cultural aspects. Soc Psychiatry Psychiatr Epidemiol. 2020:37:125–129.

30 Inandı T, Elci OC, Ozturk A, Egri M, Polat A, Sahin TK. Risk factors for depression in postnatal first year, in eastern Turkey. Int J Epidemiol 2020:31;1201–1207.

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