



Outcomes of Antepartum and Postpartum Obstetric Admissions to the Intensive Care Unit of A Tertiary University Hospital: An 8-Year Review

Üçüncü Düzey Bir Üniversite Hastanesinin Yoğun Bakım Ünitesine Kabul Edilen Antepartum ve Postpartum Obstetrik Hastaların Sonuçları: 8 Yıllık Değerlendirme

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Objective: Although their rates are decreasing, pregnancy-related mortality and morbidity are problems worldwide. In this study, we aimed to review the characteristics, diagnoses, required interventions and outcomes of obstetric patients admitted between 2006 and 2014 to the Intensive Care Unit (ICU) of a tertiary university hospital to provide an indicator for improving the management of critically ill obstetric patients.

Methods: A retrospective study of hospital records of obstetric admissions to the ICU was conducted.

Results: The pregnancy-related ICU admission rate was 0.21% among all deliveries during the study period. Nine antepartum (mean gestational age: 23 weeks) and 48 postpartum (mean gestational age: 34 weeks) obstetric ICU admissions were included. Most obstetric patients admitted antepartum were primiparous (88.8%), whereas those admitted postpartum were multiparous (64.6%). The mean ICU stay was 7 days among the patients admitted antepartum and 6 days among those admitted postpartum. Common medical reasons for ICU admission were respiratory failure and HELLP syndrome in both groups; DIC and eclampsia were also medical reasons causing ICU admission among the postpartum patients. Mechanical ventilation and blood derivative transfusion were the most common interventions required during the ICU stay of the obstetric patients. Maternal death was unique to the patients admitted postpartum (6 patients, 12.5%).

Conclusion: We reviewed obstetric admissions to our institution over an 8-year period. We believe that a nationwide study in Turkey that provides an indicator of the frequency, reasons of ICU admission and outcome of obstetric patients is required to improve the quality of intensive care.

Keywords: Pregnancy, maternal health, ICU admissions, maternal morbidity, maternal mortality

Amaç: Gebelik ilişkili mortalite ve morbidite, tüm dünyada sıklığı azalmakla birlikte halen ciddi bir problem olarak karşımıza çıkmaktadır. Bu çalışmada 2006 ile 2014 yılları arasında üçüncü düzey bir üniversite hastanesinin yoğun bakım (YB) ünitesine kabul edilen obstetrik hastaların özelliklerini, tanıları, yapılan girişimleri ve sonuçlarını gözden geçirmeyi amaçladık.

Yöntemler: Yoğun bakım ünitesine kabul edilen obstetrik hastaların hastane verileri retrospektif olarak gözden geçirildi.

Bulgular: Çalışma süresi boyunca gebelik ilişkili YB kabul oranı tüm doğumların %0,21'ini oluşturmaktaydı. Dokuz antepartum (ortalama gestasyonel yaş 23 hafta) ve 48 postpartum (ortalama gestasyonel yaş 34 hafta) dönemdeki hasta çalışmaya dahil edildi. Antepartum dönemde kabul edilen hastaların çoğu primipar (%88,8) iken postpartum dönemdeki hastaların büyük çoğunluğunu multipar gebelikler (%64,6) oluşturmaktaydı. Antepartum dönemdeki hastaların ortalama YB kalış süreleri 7 gün iken postpartum hastalarda bu süre 6 gündü. Her iki grup hastada da YB'a kabul nedeni olarak en sık karşılaşılan medikal problemler arasında solunum yetmezliği ve HELLP sendromu yer almaktaydı. Bunun yanı sıra DIC ve eklampsi de postpartum hastalarda YB'a kabul nedenleri arasındaydı. Obstetrik hastaların YB'da kalış süreleri boyunca en sık uygulanan tedaviler arasında mekanik ventilasyon ve kan ve kan ürünü transfüzyonları yer almaktaydı. Anne ölümü yalnızca postpartum dönemde YB'a kabul edilen hastalara özgüydü (6 hasta, %12,5).

Sonuç: Bu çalışmada, 8 yıllık bir sürede hastanemiz YB ünitesine kabul edilen obstetrik hastaları gözden geçirdik. Türkiye'de YB'ların kalitesini iyileştirmek için obstetrik hastaların YB'a kabul nedenleri ve sıklığına, bu hasta grubunun sonuçlarına ait bir gösterge ortaya koyan ulusal düzeyde bir çalışmaya ihtiyaç olduğu kanaatindeyiz.

Anahtar Sözcükler: Gebelik, anne sağlığı, YB kabulleri, maternal morbidite, maternal mortalite

Introduction

Maternal mortality is becoming a rare event in developed countries, with an incidence of 3 to 20%; however, it is still a problem in developing countries (1-3). The pregnancy-related mortality rate in Turkey has been reported to be 15.2 per 100,000 live births in pregnancy-related hospitalisation including delivery (4). Although mortality rate was not as high as that shown in previous reports (2, 5), improvement in maternal care is still required to decrease the obstetric mortality rate in Turkey.

Currently, pregnancy or labour complications or delivery requiring intensive care is more reliably used as an indicator of the quality of maternal health care for managing obstetric emergencies (3, 6). Studies on complications during pregnancy or

after delivery requiring admission to intensive care facilities are therefore necessary to determine future requirements for the critical care of obstetric patients (7). To our best of knowledge, only few studies have reported maternal mortality and morbidity among obstetric patients in Turkey (2, 5); there is no recent report on the comparison of antepartum and postpartum reasons requiring admission to obstetric intensive care and the outcomes of obstetric intensive care in Turkey. Therefore, in the present study, we aimed to retrospectively review obstetric admissions to the intensive care unit (ICU) of a tertiary university hospital over an 8-year period to provide an indicator for improving the management of critically ill obstetric patients at our institution.

Methods

The present study was conducted according to the Ethical Principles for Medical Research Involving Human Subjects (Declaration of Helsinki). The medical records of all obstetric patients admitted to an 18-bed mixed-type ICU of a 2,000 bed tertiary university hospital (annual number of approximately 3,500 births) between 1 January 2006 and 31 June 2014 either antepartum or in the immediate puerperium period (up to a week postpartum) for more than 24 h were retrospectively reviewed. Therefore, neither ethics approval nor informed consent was required. The records of 59 patients were reviewed for gestational age, comorbidities, duration of ICU stay (as calendar days), diagnosis during and reason for admission, obstetric diagnosis and specific intensive care interventions. Data on scoring systems for evaluating the degree of severity of the illness and assessing the risk of mortality including the Acute Physiology and Chronic Health Evaluation (APACHE II) score, Sequential Organ Failure Assessment (SOFA) score, Glasgow coma scale (GCS) score, disseminated intravascular coagulation (DIC) score and $\text{PaO}_2/\text{FiO}_2$ (mmHg) ratio for the clinical indication of hypoxaemia evaluated by ICU physicians were retrieved from the patients' records. The APACHE II score was derived from the age and chronic health status of patients with 12 routine physiological measurements: PaO_2 , temperature, mean arterial pressure, arterial pH, heart rate, respiratory rate, serum sodium level, serum potassium level, creatinine level, haematocrit, white blood cell count and GCS score; the assessment of mental status among patients based on the best eye, verbal and motor responses (8). The SOFA score was used to evaluate organ function by measuring respiratory, haematologic, hepatic, cardiovascular, neurologic and renal function (9, 10). DIC was defined as low platelet count ($<100 \times 10^9 \text{ L}^{-1}$), decreased fibrinogen level ($<3 \text{ mg L}^{-1}$), prolonged prothrombin time ($>14 \text{ s}$), prolonged partial thromboplastin time ($>40 \text{ s}$) and increased fibrin degradation product concentration (11). ARDS was diagnosed according to the Berlin criteria of 2012 by the European Society of Intensive Care Medicine (12), and sepsis was diagnosed according to the definition of the consensus committee of international organisations (13). Pre-eclampsia was defined as the presence of both hy-

per-tension and proteinuria, and eclampsia was defined as the presence of seizures during pregnancy. HELLP (haemolytic anaemia, elevated liver enzyme level and low platelet count) syndrome, if present, was separately evaluated.

Statistical analysis

Data were subjected to statistical analysis using Statistical Package for the Social Sciences version 11.0 software (SPSS Inc.; Chicago, IL, USA) and are presented as frequency (number, %), mean \pm standard deviation or median (minimum–maximum).

Results

Between 1 January 2006 and 31 June 2014, 59 obstetric patients were admitted to the ICU, comprising 0.21% of the total deliveries at our institution. The records of one patient diagnosed with posterior reversible encephalopathy syndrome, factor V Leiden mutation and systemic lupus erythematosus could not be obtained. Another patient with infertility was admitted to the ICU due to pulmonary embolism and cardiac arrest. The data on these two patients were not included. Of the remaining 57 patients, 9 were admitted antepartum and delivered after they were stabilised in the ICU. The other 48 patients were admitted postpartum. Patient characteristics with comorbidities are given in Table 1. The patients admitted antepartum were hospitalised for 4 to 53 days and their duration of ICU stay was 3 to 49 days. The patients admitted in postpartum were hospitalised for 2 to 62 days

Table 1. Characteristics and comorbidities of the patients

Characteristics	Antepartum	Postpartum
Number of patients	9 (15.8)	48 (84.2)
Gestational age, weeks	23.2 \pm 9.3	33.6 \pm 6.5
Hospitalisation, days	13 (4–53)	8.5 (2–62)
ICU stay, days	7 (3–49)	6 (1–49)
Parity		
Primiparous	8 (88.8)	17 (35.4)
Multiparous	1 (12.2)	31 (64.6)
Comorbidities*	2 (22.2)	4 (8.3)
Primary hypertension	0 (0)	2 (4.2)
Thrombophilia	0 (0)	1 (2.1)
Dilated cardiomyopathy	0 (0)	1 (2.1)
Valvular heart disease	1 (11.1)	0 (0)
Congestive heart failure	1 (11.1)	0 (0)
Data are mentioned as frequency (number, %), mean \pm SD or median (minimum–maximum).		
*The frequency of comorbidities was separately calculated among those admitted antepartum and those admitted postpartum.		
ICU: intensive care unit		

and their duration of ICU stay was 1 to 49 days. Two patients admitted antepartum had underlying diseases (22.2%): one had valvular heart disease and the other had congestive heart failure. The number of patients with underlying diseases was higher among the patients admitted postpartum: 4 patients among 48 (8.3%); the underlying diseases were primary hypertension, thrombophilia and dilated cardiomyopathy. Most patients admitted antepartum was primiparous (8 patients, 88.8%), whereas a large number of patients admitted postpartum were multiparous (31 patients, 64.6%).

Medical reasons for admission to the ICU are given in Table 2. Respiratory failure (2 patients, 22.2%) and HELLP syndrome (2 patients, 22.2%) were the two common reasons for admission to the ICU antepartum. Among the patients admitted to the ICU postpartum, respiratory failure (12 patients, 25%), HELLP syndrome (8 patients, 16.7%) and DIC (8 patients, 16.7%) were the most common diagnoses requiring intensive care. The frequency of sepsis was notably low in both groups of patients (1 patient, 11.1% admitted antepartum and 3 patients, 6.2% admitted postpartum).

Table 2. Diagnoses responsible for admission to the ICU over the 8-year period

Medical reasons	Antepartum (n=9)	Postpartum (n=48)
Respiratory system		
Respiratory failure	2 (22.2)	12 (25)
ARDS	0 (0)	2 (4.2)
Pulmonary embolism	1 (11.1)	1 (2.1)
Pulmonary oedema	0 (0)	1 (2.1)
Cardiovascular system		
Postcardiac arrest	1 (11.1)	2 (4.2)
Shock	0 (0)	2 (4.2)
Pregnancy-induced hypertension		
HELLP syndrome	2 (22.2)	8 (16.7)
Pre-eclampsia	1 (11.1)	2 (4.2)
Eclampsia	0 (0)	4 (8.4)
Haematologic system		
DIC	1 (11.1)	8 (16.7)
Others		
Anaesthetic complications	0 (0)	1 (2.1)
Multiple organ dysfunction syndrome	0 (0)	2 (4.2)
Sepsis	1 (11.1)	3 (6.2)
Data are mentioned as frequency (number, %). Frequencies were separately calculated for those admitted antepartum and those admitted postpartum. ICU: intensive care unit; ARDS: acute respiratory distress syndrome; DIC: disseminated intravascular coagulation		

Specific interventions required in the ICU are shown in Table 3. Most patients required several interventions. Mechanical ventilation (6 patients, 66.7%), antihypertensive therapy (5 patients, 55.6%) and packed erythrocyte (2 patients, 22.2%) and fresh frozen plasma (2 patients, 22.2%) transfusion were the specific interventions required for the patients admitted to the ICU antepartum. Fresh frozen plasma transfusion (25 patients, 52.1%), mechanical ventilation (21 patients, 43.8%), plasmapheresis (21 patients, 43.8%), packed erythrocyte transfusion (21 patients, 43.8%) and antihypertensive therapy (18 patients, 37.5%) were the most common specific interventions required for the patients admitted to the ICU postpartum. The mean PaO₂/FiO₂ ratio used for the clinical indication of hypoxaemia for those admitted antepartum was 139 (range, 56-420) mmHg, and that for those admitted postpartum was 300 (range, 69 to 550) mmHg. The admission and discharge scores for evaluating of the degree of severity of illness and for assessing the risk of mortality are also shown in Table 3. Accordingly, the APACHE II and SOFA scores were higher for those admitted antepartum than for

Table 3. Specific interventions performed at the ICU and admission and discharge scores and mortality rates of the patients

ICU interventions	Antepartum (n=9)	Postpartum (n=48)
Mechanical ventilation	6 (66.7)	21 (43.8)
Renal replacement therapy	0 (0)	7 (14.6)
Antihypertensive therapy	5 (55.6)	18 (37.5)
Plasmapheresis	1 (11.1)	21 (43.8)
Packed erythrocyte transfusion	2 (22.2)	21 (43.8)
Platelet transfusion	0 (0)	10 (20.8)
Fresh frozen plasma transfusion	2 (22.2)	25 (52.1)
Admission scores		
APACHE II	14 (4–23)	8 (0–33)
SOFA	7 (3–11)	4.5 (0–23)
GCS	14 (7–15)	15 (3–15)
DIC	3 (2–5)	4 (0–7)
Discharge scores		
APACHE II	4 (0–13)	4 (1–41)
SOFA	0 (0–8)	0 (0–22)
GCS	15 (15–15)	15 (15–15)
Mortality rate	0 (0)	6 (12.5%)
Data are mentioned as frequency (number, %) or median (minimum–maximum). Frequencies were separately calculated for those admitted antepartum and those admitted postpartum. ICU: intensive care unit; APACHE II: Acute Physiology and Chronic Health Evaluation II; SOFA: Sequential Organ Failure Assessment; GSC: Glasgow coma scale; DIC: disseminated intravascular coagulation		

those admitted postpartum, whereas the discharge scores for the patients admitted antepartum and postpartum were almost the same.

There was no maternal death among the patients admitted to the ICU antepartum, whereas 6 patients (12.5%) did not survive among those admitted to the ICU postpartum. The diagnoses related to admission to the ICU and comorbidities for maternal deaths among those admitted postpartum are summarised in Table 4. There were no notable consistency in the postpartum diagnoses of ICU admissions of non-surviving patients, and most patients (4 of 6) had no known comorbidities. One patient (Patient #1) at 31 weeks of gestation admitted to the ICU for respiratory failure and eclampsia with placenta decollement had primary hypertension as a comorbidity. The patient did not survive despite medical interventions including antihypertensive treatment, plasmapheresis and renal replacement therapy. Another patient (Patient #3) at 37 weeks of gestation admitted to the ICU for ARDS, DIC, pulmonary oedema and postpartum haemorrhage had no known comorbidity. Total abdominal hysterectomy was performed to contain the haemorrhage; however, the patient could not be stabilised.

Discussion

Pregnancy causes physiological changes in the cardiovascular, respiratory, renal, haematologic and endocrine systems; these changes can lead to serious complications in the antepartum or postpartum period. The number of obstetric patients admitted to the ICU is relatively low compared to the number of non-obstetric patients requiring intensive care (3, 14). Due to the low incidence, ICU physicians have a rather limited experience in managing the specific medical disorders of critically ill obstetric patients that occur during pregnancy and the peripartum period. Therefore, the main aim of this study was to provide knowledge on the admission of obstetric patients to the ICU antepartum and postpartum to obtain indicators for improving critically ill obstetric patients.

In the present study, the admission rate of obstetric patients to the ICU was 0.21% among all deliveries during the 8-year period. Pregnancy-related ICU admission rates in developed

countries have been reported to be less than 2%, whereas those in developing countries have been reported to be more than 10% of the total deliveries (1, 3, 7, 15-18). In their 5-year retrospective study of obstetric patients, Demirkiran et al. (5) reported transfer of 0.89% of all obstetric patients to intensive care. A more recent study on obstetric admission to the ICU of a Turkish tertiary referral hospital between 2006 and 2009 reported the obstetric ICU admission rate to be 1% among all obstetric patients (2). The differences in admission rates might be related to the change in ICU admission criteria over time.

The mean gestational age at admission to the ICU was 23.2 weeks among those admitted antepartum and was 33.6 weeks among those admitted postpartum (Table 1). This is similar to the results obtained by Togonal et al. (2) where the mean gestational age of the patients admitted postpartum was 35 weeks. In a study performed in the USA, the median gestational age of patients admitted to the ICU antepartum was 25.2 weeks and that of patients admitted postpartum was 36 weeks (19). A recent study in an Indian tertiary care centre with 24 women admitted to the ICU over a 1-year period indicated that most patients had a gestational age of 36 weeks (20).

Interestingly, most patients admitted to the ICU antepartum were primiparous (88.8%), whereas most patients admitted to the ICU postpartum were multiparous (64.6%) (Table 1). Similar findings were previously reported in several studies (1, 2, 21); however, there is no consistency on whether parity should be considered as a risk factor for admission to the ICU (21).

The criteria for admission to the ICU differ not only among institutions but also among countries (3). According to the literature, obstetric complications requiring admission to the ICU include hypertension, obstetric haemorrhage, severe pre-eclampsia/eclampsia, obstructed labour, puerperal sepsis and unsafe abortion (1, 3, 6, 7, 15, 22, 23). A study in a regional hospital in Hong Kong on 50 obstetric patients reported postpartum haemorrhage, pregnancy-associated hypertension and sepsis as the main causes of obstetric admission to

Table 4. Characteristics, postpartum diagnoses at ICU admission and causes of death

Patient	Age	Postpartum diagnoses at ICU admission	Comorbidities
1	34	Respiratory failure and eclampsia	Primary hypertension
2	37	Shock	Primary hypertension
3	29	ARDS, DIC, pulmonary oedema and postpartum haemorrhage	None
4	29	DIC and eclampsia	None
5	36	DIC and pulmonary oedema	None
6	27	Respiratory failure and eclampsia	None

ICU: intensive care unit; ARDS: acute respiratory distress syndrome; DIC: disseminated intravascular coagulopathy

the ICU (24). The same group recently updated their evaluation in a retrospective review of 67 patients and indicated that postpartum haemorrhage and pre-eclampsia/eclampsia are still the most common obstetric causes (21). Retrospective analyses of obstetric patients over a 7 year period indicated that pre-eclampsia/eclampsia and obstetric haemorrhage are the main causes for admission to the ICU in Jordan (25). The main reasons for admission to the ICU for 249 patients in an Australian tertiary hospital over a 2 year period were hypertensive disease of pregnancy and obstetric haemorrhage (26). A previous study in Australia proved the same, whereas the frequency of obstetric haemorrhage was higher than that of hypertensive disorders (27). Adeniran et al. (28) recently reported massive postpartum haemorrhage and severe pre-eclampsia/eclampsia as the leading causes for admission to the ICU among 90 critically ill obstetric patients over a 3-year period. The diagnoses for admission to the ICU in the USA over a 9-year period were pregnancy-related hypertensive disease, haemorrhage, cardiomyopathy or another cardiac disease, genitourinary infection, sepsis, cerebrovascular disease and pulmonary embolism, in increasing incidence order (17). These comparisons prove that not only the causes but also the incidences of obstetric complications vary among countries, and probably due to the development of new care practices with time. In Turkey, a previous study identified haemorrhage, hypertension, infections and complications due to abortion as the main causes of pregnancy-related deaths in Turkey (5). A more recent study in a tertiary referral hospital in Turkey reported pregnancy-induced hypertensive disorders, haemorrhage and respiratory failure as the most common postpartum causes for admission to the ICU (2). In the present study, respiratory failure, HELLP syndrome and DIC were major complications requiring admission to the ICU (Table 2). In their report comparing critically ill obstetric patients in an American and an Indian public hospital, Munnur et al. (29) reported a higher occurrence of HELLP syndrome among Caucasian women than among women of Asian Indian origin due to unknown reasons. In the present study, the frequency of HELLP syndrome was also high: 22.2% among the patients admitted antepartum and 16.7% among those admitted postpartum. It is important to mention that on using modern anaesthetic techniques such as regional anaesthesia during delivery, the incidence of anaesthesia-related complications during delivery that result during admission to intensive care decreases worldwide (17). In this series, there was one patient admitted postpartum (2.1%) who required intensive care for anaesthetic (17).

Downregulation of the maternal immune response during pregnancy and the peripartum period increases the incidence of the pathogenesis of an invasive infection that can cause a systemic inflammatory reaction (30). Although reported to be rare in developed countries with higher gross domestic product, sepsis is still responsible for approximately 7-15% of all admissions to the ICU worldwide (3, 15, 17, 18, 30). The frequency of sepsis was quite low in the present study: 1

patient admitted antepartum (11.1%) and 3 patients admitted postpartum (6.2%) (Table 2). This might be related to the lower number of obstetric admissions to the ICU during the study period and the characteristics of patients on admission of the obstetric department of hospitals.

It is not easy to compare the length of stay in ICU in different studies as it is highly dependent on the severity of the conditions of patients admitted during the study period. Nevertheless, the mean length of ICU stay in the present study was 7 days among the patients admitted antepartum and 6 days among those admitted postpartum (Table 1), and the APACHE II and SOFA scores on admission were high among the patients admitted postpartum and antepartum, indicating the severity of the patients (Table 3). It is important to note that the length of ICU stay was comparable to 8 days in the report by Demirkiran et al. (5) and to the range of 2 to 6.6 days reported in a previous study (6).

Mechanical ventilation was one of the most common interventions required during the ICU stay; 66.7% of the patients admitted antepartum and 43.8% of the patients admitted postpartum required it (Table 3). The frequency of mechanical ventilation requirement in the present study was comparably lower than that in the report by Tugal et al. (2); in their study on 73 patients, the requirement frequency for mechanical ventilation during the ICU stay was 85%. It is important to note that the frequency of the patients admitted to the ICU with respiratory failure (22.2% among those admitted antepartum and 25% among those admitted postpartum, Table 2) and the frequency of requirement for mechanical ventilation in the present study was within the range of 45-70% that was reported in some recent studies (16, 20). Although the frequencies change, mechanical ventilation seems to be one of the major interventions required during the ICU stay of obstetric patients.

The other common ICU intervention required in the present study was the transfusion of blood derivatives for restoring blood loss to control haemorrhage (Table 3). A previous study conducted among 125 Turkish obstetric patients stated the requirement for whole blood transfusion was around 37%, that for fresh frozen plasma transfusion was 30% and that for platelet transfusion was 22% (5). Tugal et al. (2) reported a higher frequency of requirement for transfusions (66% packed erythrocyte transfusions, 66% fresh frozen plasma transfusions, 33% platelet transfusions and 3% fibrinogen infusions) and a higher mortality rate due to severe haemorrhage. Similarly, in the present study, there was one case of maternal mortality associated with postpartum haemorrhage (Table 4).

The most interesting result of the present study was the high mortality rate (12.5%) among the obstetric patients admitted to the ICU postpartum. Mortality rates reported in obstetric patients during ICU stay range from 0% to 27% (10, 17, 18, 24). However, mortality rate is another factor that is difficult

to be compared due to its high dependence on the characteristics of the population, level of care and age and medical history of obstetric patients admitted to the ICU (6). A study showed a marked difference in the mortality rates of obstetric patients in an Indian ICU (25%) and in an American ICU (2.7%) (29). The mortality rates reported in a Turkish obstetric patient population were 10.4% between 1995 and 2000 (5) and 12% between 2006 and 2009 (2). The similar value obtained in the present study further indicated the requirement for improving the intensive care of obstetric patients in Turkey to prevent maternal mortality.

There are some limitations to our study. The number of obstetric patients included was relatively small due to the single hospital-based retrospective nature of the study. Another limitation is the lack of data for all patient-based individual risk factors and prenatal care. Similar to the literature (3, 18), most obstetric patients included in the study were admitted to the ICU postpartum; therefore, only limited information was provided on the obstetric patients admitted to the ICU antepartum.

Conclusion

We reviewed pregnant women admitted to the ICU of our institution with the aim of obtaining knowledge on current threats to maternal health to the multidisciplinary ICU team involving obstetricians, anaesthesiologists and nurses to provide adequate care for obstetric patients. The detailed report of all medical problems encountered among obstetric patients is critical to determine risk factors and presume other possible complications during ICU stay by the physicians providing care. A nationwide study is required to define admission requirements and to analyse the quality of the management of critically ill obstetric patients in Turkey.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki “Ethical Principles for Medical Research Involving Human Subjects”, (amended in October 2013).

Informed Consent: Written informed consent was not obtained from patients/patients’ who participated in this study due to the retrospective surveillance nature of the study design.

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Hasta Onamı: Çalışma dizaynı retrospektif tarama niteliğinde olduğundan geriye dönük olarak bu çalışmaya katılan hasta ve/veya hasta yakınlarından yazılı hasta onamı alınmamıştır.

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