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Patient profile and treatment outcomes of (*near-miss)* obstetric patients and evaluation of maternal mortality: a tertiary center experience

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Abstract

Objective: Severe morbidities which might result in maternal mortality are evaluated in the category of near-miss obstetric patients. Diagnosis, assessment, and treatment outcomes of near-miss patients whose mortality can be prevented with optimal and timely intervention have been accepted as indicators of maternal health status, worldwide. In this paper we evaluated characteristics and management of these cases and the maternal mortality related with the near-miss obstetric morbidities.

Methods: Among patients referred to our hospital between August 1, 2010, and October 1, 2011, file information of the cases whose the criteria complied with near-miss maternal morbidity were analyzed retrospectively Their demographic characteristics, and their data kept in the patient files of Departments of Obstetrics, and Gynecology, General Surgery, and also Intensive Care Units, and all mortality data of deceased cases were analyzed.

Results: During the study period 84 patients (3.8 %) referred with near-miss maternal morbidities. The most frequently encountered underlying etiology was severe preeclampsia and HELLP syndrome (79.8 %), followed by cases with postpartum bleeding (16.7%). Perinatal mortality rate in this near-miss population was found to be 11.9% (n=10). All patients required monitorization in the intensive care unit. Four patients died during the follow-up (4.7%).

Conclusion: The most frequently seen risk factors in near-miss patients are also predominant etiologies for maternal mortality. Timely recognition and intervention can prevent mortalities seen in majority of these patients.

Key words: Maternal mortality, near-miss, obstetric morbidity, treatment.

Neredeyse kaybedilecek (*near-miss*) obstetrik hasta profili, tedavi sonuçları ve maternal mortalite değerlendirmesi: üçüncü basamak merkez deneyimi

Amaç: Maternal ölümle sonuçlanabilecek şiddetli morbiditeler son yıllarda 'neredeyse kaybedilecek' obstetrik hasta sınıfında değerlendirilmektedir. Uygun ve zamanında müdahale ile mortalitenin engellenebildiği neredeyse kaybedilecek hastaların tanısı, değerlendirilmesi ve tedavi sonuçları tüm dünyada maternal sağlığın bir göstergesi olarak değerlendirilmeye başlanmıştır. Bu yazıda kliniğimize neredeyse kaybedilecek düzeyde ağır morbiditelerle gelen hastaların özellikleri, tedavi yaklaşımı ve mortalite olguları değerlendirildi.

Yöntem: Ağustos 2010 - Ekim 2011 tarihleri arasında neredeyse kaybedilecek maternal morbidite kriterlerine uyan hastaların bilgileri retrospektif olarak incelendi. Hastaların demografik, obstetrik, cerrahi ve yoğun bakım özellikleri ve mortalite ile sonuçlanan olguların bilgileri incelendi.

Bulgular: Çalışma periyodunda 84 hasta neredeyse kaybedilecek düzeyde morbiditeler ile başvurdu (%3.8). En sık altta yatan neden ağır preeklampsi ve HELLP sendromu (%79.8) idi. Daha sonra ise postpartum kanamalı olgular (%16.7) yer aldı. Neredeyse kaybedilecek hasta popülasyonundaki perinatal ölüm oranı %11.9 (n:10) saptandı. Tüm hastalar yoğun bakım takibi gerektirdi. Dört hasta mortalite ile sonuçlandı (%4.7).

Sonuç: Neredeyse kaybedilecek hastalardaki en sık risk faktörleri aynı zamanda maternal mortalitenin de önde gelen nedenleridir. Bu hastaların zamanında tanınması ve müdahale edilmesi ile büyük kısmında mortalite engellenebilir.

Anahtar sözcükler: Maternal mortalite, neredeyse kaybedilecek, obstetrik morbidite, tedavi.

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Introduction

Maternal mortality rates are globally accepted as the most important criteria of women's health. Among targets of healthy life for the millenium reported by World Health Organization (WHO), all encompassing fight against maternal mortality and minimization of mortality rates are included.[1] Within this frame, patients with metabolic abnormalities and severely deteriorated surgical patients secondary to obstetric complications, have a distinct, and crucial importance. Some of these patients die, and those who had received sufficient, and timely medical-surgical care can be salvaged.

Patients who survived despite development of life-threatening obstetric complications during pregnancy and postpartum period up to 42nd day were defined as near-miss patients by WHO.[2] The most important causes of near-miss maternal morbidity are complications related to obstetric hemorrhages, and hypertensive diseases of pregnancy.[3] Another important issue is that the incidence of long-term morbidities such as renal failure, respiratory tract problems, and sudden death within a year is higher when compared with the population in general.[4,5] Especially, mortalities, and morbidities related to obstetric bleedings can be largely prevented with timely, and sufficient medical, and surgical care.

Healthcare politics targeting a decrease in maternal mortality rates in our country have gained momentum beginning from the year 2000. Widespread, and effective antenatal care, increased availability of facilities enabling rapid transfer of emergency patients, establishment of sound, and reliable data banks like National Maternal Mortality Study have all reportedly decreased maternal mortality rates from 49.2/100,000 in 1998 to 19.4/100,000 in 2008.[6,7] Presently, among countries with higher-moderate income rates which participated in World Health Organization, Turkey ranks at the bottom with minimal maternal death rates.[8] On the other hand, our nationwide medical literature data related to the patient profiles of complicated cases included in the newly coined near-miss category are lacking. In the present study, the characteristic features of near-miss obstetric patients who referred with acute complications to our clinics of reference university of the region, and results of our management modalities were presented, and this issue was discussed under the light of current literature information.

Methods

Our study was planned as a retrospective clinical investigation in compliance with the principles established by Helsinki Declaration pertaining to human experiments. Electronic records of the patients referred with near-miss obstetric complications to Inonu University Faculty of Medicine, Department of Obstetrics, and Gynecology, between August 1, 2010, and October 1, 2011 were analyzed. As study inclusion criteria, 5 main criteria required for the definition of 'near-miss morbidly obstetric patient' as determined by Flippi et al. were used:[9] (1) Shock, emergent hysterectomy, caogulopathy severe bleeding requiring transfusion of more than 2 liters of blood products; (2) Severe preeclampsia, eclampsia, and diagnosis of HELLP (hemolysis, increased liver enzymes, thrombocytemia) syndrome; (3) Patients with sepsis, shock, and associated morbidities (body temperature <36°C or >38°C or systolic blood pressure <90 mmHg, and heart rate >120 bpm; (4) Diagnosis of dystocia associated with uterine rupture or dehiscence; (5) Symptoms of serious anemia (hemoglobin <6 g/dl) without evidence of severe bleeding.

Information about obstetric and demographic characteristics such as age, parity, gravida, gestational age, mode of delivery, mean birth weights, neonatal outcomes, hemodynamic status, amount of transfusion, requirement for intensive care, duration of hospitalization, intraoperative complications, morbidity, and mortality of the patients operated on were recorded.

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software (version 10.0 for Windows). All differences associated with a chance probability of .05 or less were considered statistically significant. Continuous variables are presented as mean±SD.

Results

During the study period of 15 months, 2,156 deliveries were performed in our clinics. Among them, 84 patients were cases with near-miss morbidities (3.8%). The most frequently seen underlying etiologies were severe preeclampsia, and HELLP syndrome (79.8%), followed by postpartum bleeding (16.7%). Distribution of patient diagnoses is presented in **Table 1**, and obstetric characteristics are shown in **Table 2.** Seventy-four (88.1%) patients had given birth by cesarean section. Twenty-four (35.5%) newborns required monitorization in the intensive care unit. At

Table 1. The diagnosis of near miss obstetric cases.

Tanı	n (%)
Severe preeclampsia	52 (61.9)
HELLP* syndrome	15 (17.9)
Postpartum hemorrhage	14 (16.7)
Sepsis	1(1.2)
Primary acute akut liver failure	1 (1.2)
Pulmonary thromboembolism	1 (1.2)
Total	84 (100)

*HELLP: Hemolysis, elevated liver function, decreased thrombocytes

Table 2. Demographic and obstetric features of the near miss cases.

Parameter	Mean (Min-max)
Age	28 (17-44)
Gravidity	2.2 (1-5)
Parity	1 (0-4)
Gestational week	32 (16-41)
Birth weight	2,015 (150-4,200)
APGAR 1	6 (0-8)
APGAR 5	8 (0-10)

presentation intrauterine fetal death was detected in two patients. A 16-week pregnancy terminated in abortus. Eight newborns died in the neonatal intensive care unit because of complications related to extreme prematurity In conclusion, our perinatal mortality rate in near-miss patients was found to be 11.9% (n=10).

Operations performed on near-miss patients because of postpartum bleeding, and associated placental pathologies are presented in **Table 3.** Intra- and postoperative surgical complications were not seen in none of the patients operated for obstetric bleeding In our study, all patients required monitorization in the ICU. Mean blood loss (1,428 ml; range, 500-4,000 ml), mean amount of blood transfusion (4.3 U; range 1 to 17 U), and mean ICU stay (4 days; range 1 to 7 days) were also determined. Four out of 84 patients died (4.7%). One of these patients was referred to our clinics from another center with manifestations of hypovolemic shock, and consumption coagulopathy because of atonic bleeding. The patient underwent bilateral internal iliac artery ligation together with total hysterectomy. The patient who received a total of 17 units of blood transfusion died on the postoperative first day because of multiorgan failure, and disseminated intravascular coagulation. The second patient presented to emergency service with complaints of sudden dyspnea, and loss of conscious on postoperative 5th day, and died because of masive pulmonary embolism detected on emergent echocardiography. The third case was a multipar patient who was admitted to the ICU at her 16th gestational week with diagnoses of sepsis, and intrauterine ex fetus, and despite supportive treatment she died on postpartum 5th day because of multiorgan failure, and disseminated intravascular coagulation. The fourth patient developed HELLP syndrome with concomitant eclamptic seizures after childbirth in another medical center. She died on postpartum 10th day because of intracranial bleeding, cerebral edema, and cardiopulmonary arrest Diagnoses, demographic, and obstetric characteristics of deceased patients are presented in **Table 4.**

Discussion

Studies related to salvaged near-miss women during their pregnancies, childbirth, and postpartum periods have been considered as important indicators of obstet-

Table 3. The associated placental abnormalities of the near miss cases and applied surgical interventions.

Parameter		N	%
Placental pathology	None	6	42.8
	Placenta previa	5	35.8
	Placental invasion abnormality (accreata, increata, percreata)	3	21.4
Surgical procedure	BİlAL*	6	42.8
	BİlAL+Lynch suturization	1	7.2
	BİlAL+Total hysterectomia	7	50

*BİİAL: Bilaterally internal iliac artery ligation

Table 4. Obstetrical characteristics of the cases with maternal mortality.

Parameter	Case 1	Case 2	Case 3	Case 4
Age	26	28	32	35
Diagnosis	Postpartum atony	Eclampsia+HELLP syndome	Sepsis	Pulmonary embolism
Gravidity	4	1	2	1
Parity	2	0	1	0
Mode of delivery	CS	CS	Abortus	Vaginal delivery
Week of birth	38	34	16	39
Birth weight	3400	1900	150	3400
Duration of ICU* (days)	2	2	3	1
Additional surgical procedure	BİİAL†+Total hysterectomy	none	none	none
Amount of transfusion (unit)	17	5	3	none

*ICU: Intensive care unit; †BİİAL: Bilaterally internal iliac artery ligation

ric care, and women's health, worldwide. Our study is the first report about the inventory of near-miss obstetric patients in our country. In this study, as a clinics of obstetrics, and gynecology of our regional reference hospital, our incidence of near-miss mothers, and mortality rate related to this diagnosis were found to be 3.05%, and 4.7%, respectively. According to a recently reported review by WHO about maternal morbidity, and mortality, the prevalence of near-miss mothers ranges between 0.4, and 8 percent.[10] In reports from African countries its prevalence surprisingly climbs up to 25 percent.[9] This higher prevalence has been reportedly associated with uneven distribution of maternal care services among countries, and diversities among diagnostic criteria of 'near-miss cases.

In 2009 WHO revised the diagnostic criteria of 'near-miss patients' to encompass disorders in each organ systems i.e. cardiovascular, respiratory, renal, hematologic, hepatic, and nervous systems.[2] On the other hand, some investigators reported that the frequency of overdiagnoses of near-miss patients will increase in case of usage of these criteria, and updated criteria have not been routinely used.[11,12] In our study, we used diagnostic criteria for near-miss patients recommended by Flippi et al. in 2005 instead of WHO criteria revised in 2009 because we have encountered difficulties in obtaining clinical, physiologic, and laboratory data of each organ system, and also these new criteria have not entered in routine clinical use.[5,9] In compliance with the literature, in our study hypertensive complications of pregnancy, and postpartum hemorrhages were the most (97.5%) frequently detected risk factors in near-miss patients. Thromboembolic complications which are the foremost etiologic factors of maternal mortality in developed countries were found only in our one patient who died because of cardiopulmonary arrest secondary to massive pulmonary embolism. Primary hepatic failure and sepsis are rarely seen etiologic factors which might eventually result in death of the patient (**Table 1**). A recent review by WHO on this issue have indicated that obstetric bleedings especially during postpartum period were predominant etiologic factors in maternal mortalities seen in African (33.9%), and Asian (30.8%) countries.[8] However, in Latin America hypertensive complications of pregnancy have been reported as the most frequently (25.7%) encountered causes of maternal mortalities.[8] The same review emphasizes that mortalities particularly due to pre-, and postpartum hemorrhages can be prevented, and reduction in maternal mortalities should be among the targeted priorities of the healthcare strategy. In our study, among 15 near-miss cases referred to us, and operated on for postpartum bleeding, only one patient died (success rate, 93.4%). In addition, any complication related to the intervention performed was not seen in our patients. We think that this higher success rate can be attributed to sufficient surgical experience gained by our staff about the management of serious postpartum bleeding, and most importantly to provision of rapid, and organized multidisciplinary intensive care facilities for near-miss patients in our university.

In the present study, the incidence of peripartum hysterectomy was found 0.32%. Similarly, in their 5-

year retrospective study, Çetin et al. have reported a 0.29% incidence of peripartum hysterectomy in one of the major referral center (Department of Obstetrics and Gynecology, Cerrahpasa Medical Faculty, Istanbul University) of our country.[13]

Maternal mortality rate in the present study was 185/100,000. The other referral centers in eastern and south-eastern part of the country have reported surprisingly higher mortality rates. In their 4-year follow-up, Yalınkaya et al. have reported a 1,100/100,000 maternal mortality rate.[14] In their 3-year retrospective evaluation, Şahin et al. have also reported a maternal mortality rate of 960/100,000. The obstetric haemorrhages and hypertensive complications were noticed as pioneer causes of maternal mortality cases in both of the studies. The determinative factor for the survival of near-miss patients is the provision of timely and optimal medicosurgical care. A guideline published by WHO in 2005 formulated an algorithm for the management of near-miss patients.[16] The first step in this algorithm requires from countries to have a control on their national statistical data related to maternal mortalities, and near-miss patients. Although results we obtained in our study belong to a database of a single center, they are important in that they were retrieved from a data base of a regional reference hospital in consideration of guideline recommendations of WHO.

Conclusion

Near-miss obstetric patients are acute cases rapidly nearing to their deaths. These patients can be diagnosed based on accurate diagnostic criteria, and on a large scale they can be resuscitated with timely medicosurgical management. To achieve these targets, obstetric healthcare team should be equipped with adequate armamentarium, training, and experience, and also monitorization of the patients using a multidisciplinary approach including intensive care services should be ensured.. Implementation of nationwide healthcare policies related to the management of near-miss patients might considerably decrease maternal mortality.

Conflicts of Interest: No conflicts declared.

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