 DOI: 10.18231/2394-2754.2016.0016

A study of post-surgical maternal mortality at tertiary care centre

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Abstract

Objective: To evaluate the post-surgical maternal deaths and to make recommendation & design a protocol for decreasing future mortality.

Design Retrospective analysis of post-surgical maternal mortality.

Methods Analysis of all post-surgical maternal deaths between January 2006 and December 2010.

Results and Discussion: During the study period there were 95413 deliveries in the institute. The total number of maternal deaths from January 2006 to December 2010 were 285. Out of this, 88(30.88%) were post-surgical deaths. Amongst the victims majority were unbooked (75%), multiparous (43.18%), Hindu (79.55%), coming from rural (68.18%) area. (67.05%) belongs to age group between 21 to 30 years. (72.73%) were serious at the time of admission and (42.04%) patients had haemoglobin level below 7 gm%. More than half (60.22%) died within 24 hours of hospital admission. (48.86%) patients were taken for surgery within 4 hrs. (21.59%) deaths occurred within 4hrs after surgery, (38.64%) deaths within 4-12 hrs, (21.59%). Cesarean was done in (56.83%) cases. In (28.41%) cases hysterectomy was done for postpartum hemorrhage. Out of this (10.23%) were normal vaginal delivered, (9.09%) were rupture uterus, (5.68%) were cesarean hysterectomy, (1.14%) after forcep delivery and (2.27%) after evacuation & curettage. The most common indication for caesarean was antepartum eclampsia (20%) followed by obstructed labour (12.73%). Direct causes were responsible for 84.09% and indirect causes for 15.91% deaths. Majority (38.64%) were attributable to hemorrhage, hypertensive disorders (20.45%), pregnancy related sepsis (11.36%), pulmonary embolism (9.09%) and (2.27%) were anesthesia related. Other causes were anemia, jaundice, acute respiratory distress syndrome, heart disease, chronic hypertension, aspiration pneumonitis and HELLP syndrome.(25%) patients were given whole blood and in (38.64%) patient's blood with platelets and fresh frozen plasma given. All the patients were associated with risk factors and lack of proper antenatal care, lack of knowledge, illiteracy, poor transport and late referral further increases the surgical risk.

Conclusions: Good antenatal care, high risk screening, comprehensive emergency obstetric services, hospital delivery and incorporation of obstetric drills decreases the post-surgical deaths.

Introduction

Surgery has become a part of global health care throughout worldwide usually performed to improve quality of life. The modern surgery is highly sophisticated under the umbrella of antibiotics, blood transfusion, advanced surgical and anaesthetist skills and intensive care facilities. But at the same time it is associated with marked morbidity and mortality. Even in the most competent hands there can be a disastrous complication. Similarly surgery in obstetrics usually performed to save either mother or child has become a modifiable risk factor of maternal mortality. Sometimes decision making in obstetrics, "to leave to nature or to intervene" becomes a dilemma for the treating obstetrician, as the surgical procedure carried out can make a women fight for life.

There has been an alarming increase in the incidence of LSCS globally. And in India the overall rate for cesarean delivery is 24.4% whereas the incidence rates of cesarean delivery in public, charitable, and private sector hospitals are 20, 38, and 47%, respectively, indicating progressive increase in cesarean delivery in different facility care centres.(7) Cesarean section associated complications may be anaesthetic, surgical or as a consequence of the pre-existing medical or obstetric condition related to pregnancy.

Particularly high rates occur in settings where there has been major blood loss, as can be associated with uterine rupture or other serious obstetric complications such as abruptio placentae or placenta praevia. The risk is especially high in settings where attendants have inadequate experience, safe anaesthesia is not available, or there are limited facilities for the provision of supportive care.

This study aimed to evaluate post-surgical maternal deaths, at a tertiary care referral hospital, associated risk factors and to design a protocol for decreasing future mortality.

Materials & Methods

This retrospective study has been conducted by analyzing all hospital case records from the Obstetrics and Gynaecology Department Umaid Hospital Jodhpur, hospital, from January 2006 to December 2010 for all post-surgical maternal deaths. The patients' demographic record including age, parity, birth interval, antenatal care record, type of delivery, type of surgery, status of patient, condition in which the patient was admitted to the hospital, process chart during hospital stay, interventions, problems encountered, and probable cause of death as assessed by reviewing case sheet records and final death certificates were recorded. No

autopsy were performed due to socio-religious reasons and refusal for the autopsy by relatives.

Observations

The total number of deliveries in 5 years (2006-2010) was 95413 and number of maternal deaths were 285. Out of this 88(30.88%) were post-surgical deaths (Table 1). Majority of patients 59 (67.05%) were between age group of 21-30 years, rural 60 (68.18%) multigravide 38(43.18%) and were unbooked 66(75%) (Table 2).

Table 1: Number & Percentage of Post Surgical Maternal Mortality in Present Series

Year	Total Maternal Death	Post-Surgical Maternal Death	% Post-Surgical Maternal Death
2006	47	12	25.53
2007	50	17	34.0
2008	59	25	42.37
2009	65	18	27.69
2010	64	16	25.0
Total	285	88	30.88

Table 2: Post-surgical Maternal deaths in relation to different factors(n-88)

Factors	Number	Percentage
Age in years		
<20	16	18.18
21-30	59	67.05
>30	13	14.77
Parity		
Primigravidae	36	40.91
Multigravidae	38	43.18
Grandmultipara	14	15.91
Residence		
Urban	28	31.82
Rural	60	68.18
Antenatal care		
Booked	22	25
Unbooked	66	75
Religion		
Hindu	70	79.55
Muslim	18	20.45

Table 3: Interval between Admission and Surgery

Time Interval	Number of Patients	Percentage
<4 hrs	43	48.86
4-12 hrs	26	29.55
12-24 hrs	7	7.95
1-3 days	7	7.95
>3 days	5	5.68
Total	88	100

Table 4: Interval between Surgery and Deaths

Time Interval	Number of Deaths	Percentage
<4 hrs	19	21.59
4-12 hrs	34	38.64
12-24 hrs	19	21.59
1-3 days	10	11.36
>3 days	6	6.82
Total	88	100

43(48.86%) patients were taken for surgery within 4 hrs of admission (Table 3). 19(21.59%) deaths occurred within 4hrs after surgery, 34(38.64%) deaths within 4-12 hrs, 19(21.59%) deaths between 12-24 hours(Table 4).

Table 5: Surgical procedure performed

Type of Surgery	No. of Deaths	Percentage
LSCS	50	56.82
Laprotomy for Rupture Uterus	8	9.09
Normal Delivery f/b Hysterectomy (PPH)	6	6.82
LSCS f/b Hysterectomy (PPH)	5	5.68
Forceps Delivery	5	5.68
Surgical Abortion	3	3.41
Laprotomy for Ruptured Ectopic	2	2.27
E & C f/b Hysterectomy	2	2.27
H.mole Suction and Evacuation	2	2.27
Home Delivery f/b Hysterectomy (PPH)	2	2.27
Forceps Delivery f/b Hysterectomy (PPH)	1	1.14
Normal Delivery f/b B-lynch application(PPH)	1	1.14
Home Delivery f/b Hysterectomy (PPH) f/b Re-exploratory laparotomy	1	1.14
Total	88	100

Cessarean was the most common procedure performed constituting (56.83%) cases. In (28.41%) cases hysterectomy was done for postpartum hemorrhage. Out of this (10.23%) were normal vaginal delivery, (9.09%) were rupture uterus, (5.68%) were cesarean hysterectomy, (1.14%) after forcep delivery and (2.27%) after evacuation & curettage. In one case re-exploratory laprotomy was done (Table 5).

Table 6: Causes of Post-Surgical Maternal Deaths

Cause of Death	No. of Deaths	Percentage
Direct Obstetric		
Hemorrhage	34	38.64
Hypertensive disorders	18	20.45
Pregnancy related Sepsis	10	11.36
Pulmonary Embolism	8	9.09
Anesthesia related	2	2.27
HELLP Syndrome	1	1.14
Chronic Hypertension	1	1.14
Subtotal	74	84.09
Indirect Obstetric		
Severe Anemia	3	3.41
ARDS	3	3.41
Jaundice	3	3.41
Myocardial infarction	1	1.14
Heart disease	2	2.27
Aspiration Pneumonitis	1	1.14
Malaria	1	1.14
Subtotal	14	15.91
Total	88	100

Table 6 shows that direct obstetric causes constitutes 74 (84.09%) deaths. Hemorrhage was the leading cause accounts for 34(45.95%) deaths. Hypertensive disorders of pregnancy represents the second most common cause of death which accounted for 18(24.32%) of deaths followed by infection in 10 (13.51%). 8(10.81%) deaths were due to suspected pulmonary embolism and 2(2.70%) deaths were due to anaesthesia related complications. Indirect obstetric causes constituted (15.91%) of deaths.

Discussion

Post-surgical mortality is defined as any death within two weeks of surgery from any cause. Postoperative mortality is associated with three major categories of risk factors: patient comorbidity; the surgical procedure itself; and risks directly related to anesthesia management.[1]

The risk of death is also related to skill and experience of the surgeon, post surgical care including anaesthetic and paramedical care and patient's condition.

The present study shows a higher number of post surgical maternal death constituting 30.88%. It was 27.18% in Patel et al[2] 26.6% in Purandare et al.[3] This hospital is a tertiary care referral hospital catering most of the western Rajasthan with more number of rural population ignorant of antenatal care, and most of patients were brought in critical conditions. Looking at the number of deliveries at the hospital it shows that it is burdeoned with large number deliveries which could have been conducted elsewhere in the distict hospitals. Thus providing service to large number of patients hampers the hospital capacity to focus on serious patients.

Maximum were between the age group of 21 to30 years which was 59(67.05%) and they belonged to rural areas 60 (68.18%). Reproductive efficacy is optimum between 21-30 years and maximum number of patients who seeks obstetric care belongs to this group, which can explain the maximum number of surgeries. 43(48.86%) patients were taken for surgery within 4 hours, 26(29.55%) between 4-12 hours showing the critical status requiring immediate surgery as a resort to save the life of either mother or fetus. These were the patient refereed in end stage, resistant to emergency measures. 81.82% of deaths in this study occurred within 24 hours of surgery (Table 4). Thus first 24 hours after surgery is the most critical time as there is increased risk for primary hemorrhage, Basal atelectasis, pulmonary embolism, blood transfusions, drug reactions, acute myocardial infarction, acute renal failure, septicaemia.

The patient needs to be thoroughly investigated before proceeding for surgery. But scarcity of doctors and over- burdened staff and at the same time condition requiring emergency surgery, it is impossible to screen the patient properly and some co morbid factors present in the patient are missed.

In present study cesarean section was done in 19.30% cases, and the most common surgery performed. Though Caesarean section can be a life saving procedure for some patients, decision for LSCS should be weighed with mortality risk/ benefit ratio. It can cause more than good if overused. In study by S. K. Bera (1991) cesarean was done in 17.6% and forcep applied on 19.7% of cases.

Hemorrhage accounted for 34 (45.95%) deaths which represents the most common direct obstetric cause, and the most common reason for surgery. 13(17.57%) deaths were due to postpartum hemorrhage, 11(14.86%) deaths were due to antepartum hemorrhage. Hemorrhage was responsible for hysterectomy in 18 patients out of which 9 were delivered vaginally. One patient developed peritoneal hemorrhage in the postoperative period and required re-exploration. Hence in the present study the risk of postpartum hemorrhage was not significantly increased after cesarean delivery which may be surprising because mean blood loss associated with cesarean is more than in vaginal delivery. This may reflect differential surveillance under care provided to parturient women in the immediate postpartum period according to their route of delivery.

Hypertensive disorders of pregnancy constituted 18 (24.32%) of post-surgical maternal deaths. 17 (22.97%) cases were antepartum eclampsia and 1(1.35%) were postpartum eclampsia. The eclampsia patients are at high risk of developing pulmonary edema, HELLP syndrome, cerebrovascular accidents, placental abruption and DIC. These can be prevented with judicious attention to fluid balance, use of magnesium sulphate for prophylaxis and treatment of seizures, early

involvement of intensive care specialists, enforcement of clear, written management protocols for severe pre-eclampsia in hospitals and continued education of medical and midwifery staff.

10(11.36%) deaths were due to sepsis. The predisposing factors for sepsis are frequent P/V examination, operative deliveries, post-partum hemmorhage, prolong premature rupture of membranes sexual transmitted diseases. All these deaths can be prevented by proper prophylactic and therapeutic preoperative and postoperative antibiotic coverage therapy. And hence the classical triad of hemmorhage, pre eclapmsia and sepsis was the leading cause of maternal mortality. Maternal sepsis was responsible for 22 (82%) of the cesarean section-associated maternal deaths in a study conducted by Vozo et al.[6]

8(9.09%) of deaths were due to suspected pulmonary embolism. The risk factors for the development of thromboembolism are previous thromboembolism, obesity, immobilisation, operative delivery and a positive anticoagulant test. There were 2 (2.27%) deaths related to anaesthesia. The general anaesthesia is associated with more risk and mortality. Mortality directly related to anaesthetic management is less common, and may include such causes as pulmonary aspiration of gastric contents asphyxiation and anaphylaxis.[5] These in turn may result from malfunction of anesthesia-related equipment or more commonly, human error. A 1978 study found that 82% of preventable anesthesia mishaps were the result of human error.[4]

14(15.91%) maternal deaths due to indirect obstetric causes. Anemia is an independent predictor of morbidity and mortality and it was responsible for 3(3.41%) deaths. The preoperative low hemoglobin level is significantly associated with high postoperative maternal death. Jaundice causes 3 (3.41%) deaths. Patients with jaundice are at increased risk for disseminated intravascular coagulation, hepatic coma, renal failure, pancreatitis, infections, electrolyte abnormality and hypoglycaemia and hence these patients should be properly investigated prior to surgery if possible.

In developing countries like ours, rising deaths due to surgery is not only due to increasing rates of cesareans but mainly due to lack of proper antenatal care, lack of knowledge, illiteracy, poor transport, late referral and understaffed and overworked hospitals.

Conclusion and Recommendations

Maternal mortality is a global problem. Women living in rural areas or poor women have the highest risk of dying and carry most of the burden. A good health care system, health education, regular antenatal care, screening of high risk pregnancies, comprehensive emergency obstetric services, good blood banking and transfusion services, early and timely referral, pre-operative evaluation, intensive care units for critically ill patients, proper antibiotic prophylaxis, early ambulation of patient to prevent thromboembolism and proper maintenance of input output chart are the recommendations strictly be followed. Encouraging operative vaginal deliveries, incorporation of obstetric drill in the medical curriculum, a check on the cesarean delivery, family planning advise and regular meetings to discuss surgical complications and perioperative mortality are the steps that decreases the post-surgical deaths. Thus, a holistic approach including literacy, nutrition, social and economic empowerment alone can relieve the burden of maternal mortality rate from the National Health Statistics.

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