Analytical Study of Complications of Third Stage of Labour in a Tertiary Care Centre in Bhopal, Madhya Pradesh - An Observational Prospective Study

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ABSTRACT

BACKGROUND

The third stage of labour starts when the fetus has completely delivered and ends with the complete expulsion of the placenta. The third stage of labour is usually uneventful, although significant complications can occur in this period, the most common is postpartum haemorrhage (PPH). The purpose of this study was to identify the various third stage complications, their incidence, and associated risk factors in patients admitted to the centre.

METHODS

This is a prospective observational study performed in the Department of Obstetrics and Gynaecology, Gandhi Medical College and Sultania Zanana Hospital (SZH), Bhopal conducted from 1st October 2010 to 30th September 2011. All patients who delivered in our centre or outside and developed a third stage complication were included in the study.

RESULTS

There were a total of 10,277 deliveries during the study period and 171 cases of third stage complications. The incidence of third stage complication was 1.66 %. The most common third stage complication was traumatic PPH (52.1 %) and the least common was inversion of uterus (2 %) but the case fatality rate (20 %) was higher in the latter. The incidence of traumatic PPH was highest among the primipara patients (72.9 %) and in the grand multipara, atonic PPH topped the list occurring in 57.8 % of the patients.

CONCLUSIONS

As third stage complications occur in approximately 1 in 60 deliveries and cause 19.3 % of the total maternal deaths, it is of utmost importance to outline an effective treatment for the management of postpartum haemorrhage. This could further help in reducing maternal mortality significantly.

KEYWORDS

Third Stage of Labour, Atonic Postpartum Haemorrhage, Traumatic Postpartum Haemorrhage, Retained Placenta, Uterine Inversion, Peripartum Hysterectomy

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BACKGROUND

The third stage of labour starts when the fetus has completely delivered and ends with the complete expulsion of the placenta. The risk of complications does not end with the delivery of the placenta, therefore, sometimes a fourth stage of labour is mentioned in literature. This starts after the delivery of placenta and can last for a varying time. Most of the teaching is concentrated on the first and second stage of labour, however, neglecting the third stage of labour can be disastrous in many situations. One respected author rightly said about the third stage of labour: "This indeed is the unforgiving stage of labour, and in it lurks more unheralded treachery than in both the other stages combined. The normal case can, within a minute, become abnormal and successful can turn swiftly to disaster."[1]

The most common complication occurring during the third stage of labour is postpartum haemorrhage (PPH), although most of the time the third and fourth stages of labour are uneventful. The developed countries face a maternal mortality (direct) rate of around 7 - 10 women per 100,000 births, out of which, 10 % are caused by PPH.[2] On the contrary, in developing countries, maternal mortality rates are as high as 1000 women per 100,000 live births. According to data provided by World Health Organization (WHO), 25 % of these maternal deaths can be attributed to PPH, which equates to 100,000 maternal deaths per year due to PPH. The newborn and other surviving children of these mothers are also seriously affected emotionally and physically.

Postpartum anaemia is the most common complication seen after the complications of the third stage of labour. Blood lost in these complications leads to poor iron reserves further leading to anaemia. Postpartum anaemia has a widespread effect on the women's recovery as it may lead to prolonged hospitalization, difficulty in the establishment of breastfeeding. Further, weakness and fatigue caused in the women due to anaemia may also interfere in the proper care of the baby. Blood and product transfusion helps prevent anaemia and may lead to an early discharge from the hospital but carries the risk of blood transfusion reaction and infection. More importantly in a country like India, access to safe blood is not universal. Surgical interventions may be required in severe PPH, retained placenta, and uterine inversion. This further puts the mother at risk of anaesthetic complications and sepsis.

Keeping in mind that prompt recognition and efficient treatment of the complications of the third stage of labour can mean the difference between life and death, we studied the incidence, risk factors, and management of these complications which are the most common cause of maternal death in both developing and developed countries.

Objectives

1. To determine various third stage complications in patients admitted to Sultania Zanana Hospital.
2. To determine the proportions of probable risk factors for various third stage complications.
3. To assess the correlation of third stage complications with the mode of delivery and place of delivery.
4. To determine the feto-maternal outcome.

METHODS

The present study entitled "Analytical study of complications of third stage of labour in a tertiary care centre" is a prospective analytical study performed in the Department of Obstetrics and Gynaecology, Gandhi Medical College, and Sultania Zanana Hospital (SZH), Bhopal. It is a hospital-based prospective analytical study conducted over a period of one year from 1st October 2010 to 30th September 2011. Informed consent was taken from all women participating in the study.

Inclusion Criteria

1. All women who delivered in Sultania Zanana Hospital and had one or other complication of the third stage of labour.
2. All women who delivered outside Sultania Zanana Hospital and were admitted with one or other complications of third stage of labour.

This is an analytical study to know the individual incidence of various third stage complications, risk factors associated, demographic distribution pattern, correlation of parity, mode of delivery, place of delivery, and the time since delivery in the development of various third stage complications, along with the causes of maternal morbidity, mortality and perinatal outcome in these cases over the study period i.e., 1st October 2010 to 30th September 2011.

Relevant data was extracted using a pre-designed form shown below. All cases developing complications of the third stage of labour whether delivered in Sultania Zanana Hospital, Bhopal, or delivered elsewhere and then referred to Sultania Zanana Hospital, Bhopal were included in this study.

Data on age, place of residence, parity, obstetric history, booking status, mode of delivery, place of delivery, time since delivery, type of third stage complication, risk factors associated, immediate morbidity, and complications. Need for blood transfusion, maternal & fetal outcome was analyzed in detail.

Data was collected by filling out a detailed case proforma which included all the information required for the study. It also included a questionnaire asking about the patient's relevant history.

Statistical Analysis

No statistical analysis was done. The study was a prospective observational study involving analysis of data.

RESULTS

During the study period from 1st October 2010 to 30th September 2011, there were 10,277 deliveries and 171 cases of third stage complications were tackled, accounting for an incidence of 1.6 % i.e., 1 per 60 deliveries.

	≤ 20		**21**	**12.3 %**
Age (in years)	21 - 25		76	44.4 %
	26 - 30		59	34.5 %
	31 - 35		14	8.2 %
	> 35		01	0.6 %
Parity	Primi		74	43.2 %
	Multi		78	45.7 %
	Grand multi		10	11.1 %
Residence	Rural		120	70.2 %
	Urban		51	29.8 %
Booking status	Booked		20	11.7 %
	Unbooked		151	88.3 %
Educational status	Educated		48	28.1 %
	Uneducated		123	71.9 %
Place of delivery	SZH		51	29.8 %
	Outside SZH		120	70.2 %
Mode of delivery	Vaginal		155	90.6 %
	Instrumental		42 (n = 155)	27.1 %
		OFD*	21 (n = 42)	47.4 %
		LMCF delivery**	12 (n = 42)	28.6 %
		Ventouse delivery	9 (n = 42)	21.4 %
	Abdominal		16	9.4 %

Table 1. Demographic Details of the Patients

*Outlet forceps delivery, ** Low mid cavity forceps delivery

As shown in table 1, the most common age group developing 3rd stage complications were 21 to 30 years. The complications developed in primipara and multipara patients with the same frequency i.e., 43.2 % and 45.7 %, respectively. Most patients (78.9 %) were residents of rural areas and the majority (88.3 %) were unbooked. Maximum number of patients (71.9 %) were uneducated. Mainly the patients who developed 3rd stage complications delivered outside SZH. The mode of delivery in a vast majority of patients was vaginal delivery (90.6 %). Out of these 42 i.e., 27.1 % patients had instrumental deliveries. Outlet forceps was used in half of these patients, LMCF was used in 12 (28.6 %) patients and 9 (21.4 %) were delivered using a ventouse.

	Atonic PPH	**Traumatic PPH**	**Retained Placenta**	**Inversion of Uterus**
Total cases (n = 171)	48 (28.1 %)	89 (52.1 %)	29 (16.9 %)	5 (2.9 %)
Primi (n = 74)	10 (13.5 %)	54 (72.9 %)	6 (8.2 %)	4 (5.4 %)
Multi (n = 78)	27 (34.6 %)	31 (39.7 %)	19 (24.4)	1 (1.3 %)
Grand multi (n = 19)	11 (57.8 %)	4 (21.1 %)	4 (21.1 %)	0

Table 2. Various 3rd Stage Complications According to Parity

As evident from table no. 2, the most common 3rd stage complication was traumatic PPH occurring in 52.1 % of cases. This was followed by atonic PPH in 48 (28.1 %) women, retained placenta in 29 (16.9 % cases), and inversion of uterus in 5 (2.9 %) women. If we look at only the primipara patients, traumatic PPH is the major cause (72.9 %) of 3rd stage complications. In grand multipara patients, the most common 3rd stage complication occurring is atonic PPH. The multigravidae women had PPH in most women, traumatic in 21 (39.7 %) women, and atonic PPH in 27 (34.6 %) women.

If we look at the complications individually, atonic PPH was seen in most commonly the multi patients (56.3 %)) followed by grand multi (22.9 %)) and primipara patients (20.8 %). Traumatic PPH was the commonest in primipara patients (60.6 %). Retained placenta was the commonest in multi patients i.e., 65.5 % patients were multi who developed retained placenta. Uterine inversion happened most commonly in primipara patients (80 %).

Sl. No.	**3rd Stage Complication**	**Risk Factors**	**Number**	**%**
1	Atonic & Traumatic PPH (n = 135)	Fair size baby (birth weight > 3.5 kg)	33	24.1 %
		Dai handled case	31	22.6 %
		Augmented labour	22	16.2 %
		Antepartum haemorrhage	20	14.6 %
		Grand multiparity	15	10.9 %
		H/o PPH in a previous pregnancy	12	8.7 %
		Multiple pregnancy	04	2.9 %
2	Retained Placenta (n = 29)	H/o instrumentation in previous pregnancy	15	51.7 %
		H/o previous LSCS	8	27.6 %
		Placenta accreta/ Increta	6	20.7 %
3	Inversion of Uterus (n = 5)	Atonicity	1	20 %
		Delivery by untrained personnel	4	80 %

Table 3. Distribution of Risk Factors Elicited for 3rd Stage Complications

The two most common risk factors for PPH are fair size baby (birthweight > 3.5 kg) and if the delivery is conducted by an untrained dai which occurred in 24.1 % and 22.6 % cases respectively. This is followed by augmented labour and antepartum haemorrhage (APH) seen in 16.2 % and 14.6 % cases, respectively.

The most common risk factor for retained placenta is the history of instrumentation in the previous pregnancy seen in 51.7 % of cases. History of previous LSCS was seen in 27.6 % of the patients developing retained placenta. Placenta accrete was seen in 20.7 % of the patients developing retained placenta. Delivery by untrained personnel is the most common risk factor in inversion of the uterus seen in 80 % of the cases of uterine inversion. However, atonicity also leads to uterine inversion in one patient i.e., 20 % cases.

Management			**Number**	**%**
Medical			112 (n = 171)	65.4 %
Surgical	Systemic devascularization		37 (n = 171)	21.6 %
	Uterine compression sutures		12 (n = 171)	7.2 %
	Obstetric hysterectomy		10 (n = 171)	5.8 %
	Indications:	Placenta accreta	6 (n = 10)	60 %
		Rupture uterus	3 (n = 10)	30 %
		Atonic PPH	1 (n = 10)	10 %

Table 4. Management of the Third Stage Complications

Table no. 4 highlights the various management methods employed for controlling postpartum haemorrhage. Out of the total of 171 patients, 112 could be managed with medical methods. These included oxytocics like intravenous oxytocin infusion, misoprostol (vaginal or rectal), and intramuscular or intramyometrial carbopost injection. Systemic devascularisation (i.e., ligation of uterine arteries followed by ovarian arteries and lastly the ligation of the internal iliac artery) was done in 37 patients (21.6 %). Uterine compression sutures like B lynch, cho suture was done in 12 i.e., 7, 2 % of the patients. Obstetric hysterectomy was done in 10 patients (5.8 %) who

responded to none of the above measures. The most common indication of obstetric hysterectomy was placenta accrete seen in 6 out of 10 patients. This was followed by rupture of uterus in 3 patients and refractory atonic PPH in 1 patient.

As shown in table no. 5, more than half of the patients i.e., 72.5 % developed postpartum anaemia after having one or other third stage complication. Other immediate complications were shock and disseminated intravascular coagulation (DIC) seen in 23.9 % and 3.6 % of patients, respectively. There were 13 mortality i.e., 7.6 % of the total patients with third stage complications. The cause of death in all 13 patients was irreversible haemorrhagic shock caused by atonic PPH in 6 patients, traumatic PPH in 5 patients, and retained placenta and inversion of uterus in one each. Out of 171 patients, 114 i.e., 66.7 % patients had alive babies 42 i.e., 24.6 % had stillborn babies mostly seen in cases of APH, obstructed labour, and home deliveries.

Maternal Outcome	**Postpartum Anaemia**	**124 (72.5 %)**
	Shock	41 (23.9 %)
	Disseminated intravascular coagulation (DIC)	06 (3.6 %)
	Maternal death	13 (7.6 %)
	-Atonic PPH (n = 13)	06 (46.1 %)
	-Traumatic PPH (n = 13)	05 (38.5 %)
	-Retained placenta (n = 13)	01 (7.7 %)
	-Inversion of uterus (n = 13)	01 (7.7 %)
Fetal Outcome	Alive at discharge	114 (66.7 %)
	Stillborn	42 (24.6 %)
	Neonatal death	15 (8.7 %)

Table 5. Maternal and Fetal Outcome

DISCUSSION

The complications of third stage of labour affect women of all age groups, most commonly seen in 21 - 25 years of age. The reason for that being that this is the most common age group for reproduction which indirectly points towards a very early marriage of girls in this part of the country. Most patients were from a rural background and unbooked. This points out the fact that strengthening of health services is required in the rural areas of the country. Most patients were uneducated. Education definitely brings awareness in an expecting mother and can lead to seeking of better antenatal care by her. The majority of patients delivered vaginally i.e., 90.6 %. Out of these, 42 i.e., 27.1 % patients had instrumental deliveries which is comparatively higher to what is reported in earlier studies (10 to 15 %) by Ameh CA et al.[3] This may explain the higher number of traumatic PPH in our study as compared to other study as traumatic PPH is more associated with instrumental delivery.

Amongst the 171 cases of third stage complications, the most common in our study was traumatic PPH occurring in 89 cases of the total i.e., 52.1 %. This is similar to Balki M et al.[4] who concluded that the most common third stage complication requiring blood transfusion was traumatic PPH in 38.5 %. In contrast, Naz et al.[5] noted that the most common third stage complication was atonic PPH comprising 58 % of total cases. The disparity with the present study is evident as active management of the third stage of labour is used in all patients delivered in our centre leading to a decrease in the number of patients developing atonic PPH. The increasing number of cases of traumatic PPH can be attributed to the increasing use of prostaglandins and oxytocin for induction and augmentation of labour. The other reason for this may be due to the fact that our centre is a referral centre catering to many nearby districts. Many cases of atonic PPH may get unnoticed because of improper quantification of the blood loss in the centres where the delivery was conducted. In contrast to this, traumatic PPH is a diagnosis that is clinically evident.

Similar to the present study, Naz et al.[5] noted that 9 (18 %) cases were nulliparous, 22 (44 %) cases were having parity 1 - 4 and 19 (38 %) were having parity 5 or more. Great grand multipara was traditionally thought to be at high risk of PPH, but Abu-Heija AT et al.[6] suggested that their risk may be no greater than that of women of lower parity. Landy et al.[7] concluded that amongst the patients sustaining perineal lacerations 42.7 % were nulliparous and 57.3 % were multiparous. Memon SR et al.[8] found that the average parity for the patients developing retained placenta was 4.6. Bibi S et al.[9] noted that maximum patients developing PPH i.e., 41.4 % were delivered by trained birth attendants, followed by 29.4 % by lady health workers and 19.2 % were delivered by doctors. These findings bring into light that 100 % institutional deliveries are very important to prevent the conversion of a normally progressing labour into a life-threatening complication of the third stage of labour. The initial 2 to 4 hours after delivery are extremely crucial for the patient if she develops any of the third stage complications. Of the 14 million women who develop postpartum haemorrhage each year, 1 - 2 % die, with an average interval from onset of bleeding to death of 2 to 4 hours as quoted by AbouZahr C.[10]

Birth weight is an important parameter for the development of third stage complications especially PPH whether atonic or traumatic. In the current study, 23.9 % of cases had baby weight ≤ 2.5 kg, 56.7 % of cases had baby weight between 2.6 and 3.5 kg and 19.4 % cases had baby weight > 3.5 kg. All patients having birth weight more than 3.5 kg had either atonic or traumatic PPH. Landy et al. [7] made a similar conclusion by stating that amongst patients developing third or fourth degree lacerations 4.1 % of cases had baby weight < 2.5 kg, 63.5 % cases had baby weight between 2.5 and 3.5 kg and 32.4 % cases had baby weight > 3.5 kg.

Naz et al.[5] have concluded in their study of 50 cases of PPH that APH, cephalopelvic disproportion (CPD), obstructed labour, pre-eclampsia, multiparity, especially grand multiparity, and failure to progress are all risk factors for PPH. The frequency of PPH is more common in patients with APH (Abruptio placentae and Placenta praevia).[6,7] Landy et al.[7] in their study noted that risk factors for third and fourth degree lacerations included nulliparity, being Asian or Pacific Islander, increasing birth weight, operative vaginal delivery, episiotomy, and longer second stage of labour. Out of the patients developing third stage complications, 124 i.e., developed postpartum anaemia, 43 i.e., 25.1 % developed shock, and 6 i.e., patients developed DIC. Postpartum bleeding leads to severe anaemia in about 11 % of the 14 million women with postpartum haemorrhage each year.[11]

Out of the 171 patients, 10 i.e., had to undergo an obstetric hysterectomy. The most common indication for obstetric hysterectomy was adherent placenta in 5 cases, followed by traumatic PPH in 3 cases and atonic PPH in 1 case. Nayama M et al.[12] concluded that the cumulative incidence of an emergency hysterectomy varies between regions but it is estimated at between 0.04 and 1.25 % of all deliveries.

Postpartum haemorrhage is the most common cause of maternal death.[9] In the present study, maternal mortality occurred in 13 patients i.e., 7.6 % of the patients developed third stage complications. Out of the 13 patients, 6 patients were of atonic PPH, 5 patients were of traumatic PPH, and 1 patient each of retained placenta and inversion of the uterus. Priya N et al.[13] noted that the most common cause of maternal mortality is postpartum haemorrhage. Postpartum haemorrhage accounted for 70.83 % of deaths in a study conducted by Purandare et al.[14] over a period of 5 years. Nationally, haemorrhage accounts for 21.49 % of the deaths.

CONCLUSIONS

In today's world of advancing health sciences, it is unacceptable that we still lose mothers due to complications of labour. The ordeal that the family undergoes in case a mother is lost during parturition is unspeakable leave alone the plight of the child who is left without a mother.

The present study concludes that all antenatal patients should receive proper obstetric care and 100 % institutional delivery should be encouraged. Active management of the third stage of labour should be advocated in all centres with administration of prophylactic oxytocin, cord clamping, and delivery of placenta by controlled cord traction. In addition, the staff of primary and secondary health centres should be trained to deal with obstetric emergencies so that the time wasted in referral can be saved which in turn will reduce the morbidity and mortality of patients.

As third stage complications occur in approximately 1 in 60 deliveries and cause 19.3 % of the total maternal deaths, immense emphasis should be given to the effective treatment for the management of postpartum haemorrhage. This could contribute significantly to the goal of reducing maternal mortality.

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