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Original Research Article

Study of causes and various modalities of management in postpartum hemorrhage at a tertiary care centre

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ABSTRACT

Background: Postpartum haemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide, particularly in low and middle-income countries. This study aimed to evaluate the causes and management strategies of postpartum haemorrhage at a tertiary care centre in India.
Methods: This hospital-based case series study was conducted at S. Nijalingappa Medical College, Bagalkot, over 18 months from August 2022 to February 2024. The study included 35 cases diagnosed with postpartum haemorrhage, defined as blood loss ≥500 ml within 24 hours after vaginal birth or ≥1000 ml after caesarean delivery. Data was collected using a structured proforma through patient interviews and medical record reviews.
Results: Most postpartum haemorrhage cases (65.7%) occurred in women aged 20-30 years and in primiparas (65.7%). Uterine atony was the leading cause (68.6%), followed by genital trauma (31.4%). Medical management with misoprostol (94.3%) and oxytocin (91.4%) was most common, along with carboprost (74.2%). Mechanical management included uterine massage (68.6%) and bimanual compression (57.1%). Surgical interventions included uterine artery ligation (28.6%), B Lynch sutures (20%) and obstetric hysterectomy (11.4%). Most patients (71.4%) had extended hospital stays exceeding 5 days.
Conclusions: The findings emphasize the importance of having essential medications readily available and maintaining surgical expertise for managing severe cases. This study highlights the need for improved antenatal care, standardized management protocols, and early intervention strategies in similar healthcare settings.

Keywords: India, Maternal mortality, Postpartum haemorrhage, Tertiary care

INTRODUCTION

Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide, particularly in low and middle-income countries.[1] Defined as blood loss of 500 ml or more within 24 hours after birth, PPH affects approximately 5% of all deliveries globally.[2] PPH is a major cause of pregnancy-related death in both developed and undeveloped countries and is the highest cause of obstetric disease-specific morbidity.[3,4] In severe cases, it can lead to hypovolemic shock, multi-organ failure, and death if not promptly recognized and treated.[5]

The etiology of PPH is multifactorial, commonly attributed to the "four Ts": Tone (uterine atony), Tissue (retained placental tissue), Trauma (genital tract injuries), and Thrombin (coagulation disorders).[6]Uterine atony, the failure of the uterus to contract effectively after delivery, is responsible for up to 80% of PPH cases.[7]

Identifying risk factors for PPH is crucial for prevention and early intervention. Known risk factors include prolonged labor, multiple pregnancies, macrosomia, and previous caesarean section, among others.[8] Despite advances in obstetric care, the incidence of PPH has been

increasing in recent years, even in high-resource settings.[9] This trend explains the need for continued research and vigilance in managing this potentially life-threatening condition. Tertiary care centres play a pivotal role in managing complex obstetric cases, including severe PPH, due to their advanced facilities and specialized expertise.[1]

The objective of the study is to evaluate the causes and various modalities of management of postpartum hemorrhage at a tertiary care centre. By analyzing a series of postpartum hemorrhage cases, we seek to characterize the demographic and clinical features of patients experiencing PPH and evaluate the causes of PPH and the effectiveness of various management strategies employed.

Understanding the local context of PPH is essential for developing targeted interventions and improving maternal care protocols. This study's findings will contribute to the existing body of knowledge on PPH and may inform evidence-based practices for prevention, early recognition, and management of PPH in similar healthcare settings.

METHODS

Study place

This study was a hospital-based case series conducted at S. Nijalingappa Medical College, Bagalkot.

Study duration

The study was over a period of 18 months from August 2022 to February 2024

Inclusion criteria

The study included 35 cases which are diagnosed as postpartum hemorrhage (PPH) that occurred during this period. PPH was defined as blood loss of 500 ml or more within 24 hours after birth for vaginal delivery and 1000 ml or more for cesarean delivery, as per the World Health Organization criteria.

Sampling method

The researchers employed purposive sampling, specifically total population sampling, to include all eligible PPH cases during the study period.

Data collection

Data was collected using a structured proforma through direct interviews with patients and review of medical records.

Information gathered included demographic data, obstetric history, current pregnancy details, mode of delivery and management strategies employed. Two trained researchers independently extracted data to ensure accuracy, with any discrepancies resolved through discussion or consultation with a senior obstetrician. Informed consent was obtained from all participants, and confidentiality of the collected information was strictly maintained throughout the study.

Statistical analysis

Data analysis was performed using SPSS software version 21.0. Descriptive statistics were used to summarize the clinical profile and outcomes. Continuous variables were presented as means with standard deviations or medians with interquartile ranges, depending on the distribution.

Categorical variables were presented as frequencies and percentages. Chi-square tests or Fisher's exact tests were used for categorical variables, and t-tests or Mann-Whitney U tests for continuous variables, as appropriate. A p value of less than 0.05 was considered statistically significant.

RESULTS

Table 1 provides an overview of the patient population affected by postpartum hemorrhage. The majority of cases (65.7%) occurred in women aged 20-30 years, and primiparas accounted for 65.7% of cases.

Most deliveries (65.7%) were at term (37-40 weeks), with a nearly even split between vaginal (51.4%) and caesarean (48.6%) deliveries. These data help identify the demographic most at risk for PPH in this setting.

Table 2 outlines the association of causes of PPH and mode of delivery. Uterine atonicity was the most common cause (68.6%), followed by genital trauma (31.4%).

Table 3 outlines the various interventions used to manage Postpartum hemorrhage. Medical management, particularly with misoprostol (94.3%) and oxytocin (91.4%), was the most common approach along with Carboprost (74.2%) and Methergine (17.1%).

Mechanical procedures like uterine massage (77.1%) were also frequently employed along with Bimanual compression of the uterus (65.7%) and Bakri balloon tamponade (5.7%). Surgical interventions included uterine artery ligation (28.6%), B lynch sutures (20%), and obstetric hysterectomy (11.4%) in severe cases. This data provides insights into the treatment protocols followed at the institution.

Table 4 outlines most patients (71.4%) had extended hospital stays of more than 5 days, indicating substantial morbidity. These findings highlight the severity of PPH and identify factors associated with poor outcomes.

Table 1: Demographic and clinical characteristics of postpartum hemorrhage (PPH) cases (n=35).

Characteristics		Frequency(n)	(%)
Age range	<20	6	17.1
	20-30	23	65.7
	31-40	5	14.3
	41-50	1	2.9
Parity	Primipara	23	65.7
	Multipara	12	34.3
Gestational age (weeks of gestation)	32-36	11	31.4
	37-38	13	37.1
	39-40	10	28.6
	41-42	1	2.9
Mode of delivery	Vaginal	18	51.4
	Lower segment	17	48.6
	Caesarean section (LSCS)		

Table 2: Association of causes of Postpartum hemorrhage and mode of delivery (n=35).

Causes of PPH	Vaginal delivery (n=18)	LSCS (n=17)	(%)	P value
Uterine atony	9 (50%)	15 (88.2%)	68.6	0.018
Genital trauma	11 (61.1%)	0	31.4	<0.001
Coagulopathy	3 (16.7%)	2 (11.8%)	14.3	1
Retained products	3 (16.7%)	1 (5.9%)	1.4	0.603

Table 3: Management Strategies for postpartum hemorrhage (n=35).

Management strategy		Frequency (N)	(%)
Medical management	Misoprostol	33	94.3
	Oxytocin	32	91.4
	Carboprost	26	74.2
	Methergine	6	17.1
Mechanical procedures	Uterine massage	27	77.1
	Bimanual compression	23	65.7
	Vaginal and cervical tear	12	34.3
	suturing		
	Dilatation and curettage	4	11.4
	Uterine packing	3	8.6
	Bakri balloon tamponade	2	5.7
Surgical interventions	Uterine artery ligation	10	28.6
	B - lynch sutures	7	20
	Ovarian artery ligation	3	8.6
	Internal iliac artery ligation	2	5.7
	Obstetric hysterectomy	4	11.4

Table 4: Duration of hospital stay (n=35).

Hospital Stay	Frequency (N)	(%)
>5 days	25	71.4
≤ 5 days	10	28.6

DISCUSSION

Postpartum hemorrhage (PPH) remains a significant cause of maternal morbidity and mortality worldwide, particularly in developing countries. Despite advancements in obstetric care, PPH continues to challenge healthcare providers due to its potentially rapid onset and life-threatening nature. Our study included 35 cases of postpartum hemorrhage, with the majority of patients (65.7%) falling within the 20–30-year age group.

This finding aligns with the study by Bateman et al who reported a mean age of 28.9 years among PPH cases.[10] The predominance of younger women in our cohort may reflect the general childbearing age in our population.

Primiparity was observed in 65.7% of our cases, which is higher than the 40.5% reported by Nyflot et al in a large population-based study in Norway.[11] This difference might be attributed to variations in population characteristics and healthcare systems. The high proportion of primiparous women in our study shows the importance of vigilant monitoring and preparedness for PPH in this group.

The mode of delivery showed a relatively even distribution between vaginal (51.4%) and caesarean (48.6%) deliveries, differing from Kramer et al possibly due to variations in obstetric practices or patient populations.[12] Even though having a prior caesarean section or one during the current pregnancy are factors that are traditionally linked to a higher risk of severe maternal outcome, this association could not be established in the current study, most likely due to insufficient participant numbers.

Uterine atony was the leading cause of PPH (68.6%), consistent with Mehrabadi et al who reported uterine atony as the cause in 79% of PPH cases in Canada.[13] The consistency across studies reinforces the critical importance of active management of the third stage of labor and prompt recognition and treatment of uterine atony.

Management strategies primarily focused on medical interventions, with misoprostol (94.3%) and oxytocin (91.4%), carboprost (74.2%) being the most commonly used drugs, aligning with current international guidelines and findings from Mousa et al. The use of mechanical methods such as and uterine massage (68.6%), bimanual compression of the uterus (57.1%), vaginal and cervical tear suturing (34.3%) and dilatation and curettage (11.4%), uterine packing (8.6%) was prominent in our study.[14]

These techniques are essential first-line measures in managing PPH and are recommended by the World Health Organization. Surgical interventions, including uterine artery ligation (28.6%) and B Lynch sutures (20%), were employed in severe cases. The obstetric hysterectomy rate (11.4%) was higher than reported by Sahu et al, reflecting the severity of cases at the tertiary care centre.[15]

The extended hospital stay for most patients (71.4% staying more than 5 days) aligns with Kramer et al indicating substantial morbidity and healthcare resource requirements.[15] These findings emphasize the need for early intervention, standardized management protocols, and improved antenatal care to address risk factors and potentially reduce the overall burden of PPH on patients and healthcare systems.

CONCLUSION

The management of postpartum hemorrhage in our centre relied heavily on pharmacological interventions, with misoprostol, oxytocin, and carboprost being the most commonly used drugs. This aligns with current international guidelines and emphasizes the importance of having these medications readily available in all delivery settings. Surgical interventions, particularly uterine artery ligation and B Lynch sutures, played a significant role in managing severe cases of PPH.

The relatively high rate of obstetric hysterectomy in our study highlights the severity of cases presenting at our tertiary care centre and the need for skilled surgical teams to be available. This study contributes to the understanding of postpartum hemorrhage patterns and management in a tertiary care setting in India. The findings can inform clinical practice, guide resource allocation, and highlight areas for future research in prevention and management of postpartum hemorrhage. Efforts should focus on improving antenatal care to address risk factors, ensuring the availability of necessary medications and surgical expertise and developing protocols for early identification and management of postpartum hemorrhage.

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