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Uterine Rupture in Peripartum Hysterectomy Cases - A Single Centre Experience

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Abstract

Background: Uterine rupture during pregnancy or labour is an unexpected , rare event and potentially life-threatening devastating complication. Uterine rupture is defined as tearing/disruption of the uterine wall with or without involvement of the overlying peritoneum (uterine serosa) and fetal membranes. Inspite of advances in modern medicine and healthcare facilities uterine rupture still contributes significantly to feto-maternal morbidity and mortality. The aim of the study is to present the frequency of occurrence of uterine rupture in peripartum hysterectomy cases and also to evaluate other histomorphological findings in relation to the risk factors.

Material And Methods: In this hospital based cross-sectional study during a eleven year period (Jan 2009 – Dec 2019), 18 uterine rupture cases out of 101 peripartum hysterectomy specimens received in the department of Pathology, RIMS, Imphal, Manipur were included for the study. The gross and histomorphological findings were evaluated, studied, statistically analysed and correlated with the risks factors.

Results: The rate of uterine rupture in the present study was 1/4496 births or 0.22/1000 births. The mean age of the uterine rupture cases was 32.66years with majority (72.22%) in the age group of 30-39 years. Considering parity a 100% occurrence was seen in multiparous women (2 or more pregnancies). The relation between multiparity and uterine rupture was significant as evidenced by the p –value of 0.02. Majority (77.7%) showed rupture of the lower uterine segment with lesser fundic (22.3%) rupture. Other associated findings were adherent placental tissue was seen in 7 (38.8%), abnormal site of placentation in the lower uterine segment 12(66.6%), intrauterine death in 3(16.6%),

leiomyoma 1 case, abruption-placentae 1case, infection 2 cases and 1case with features of invasive mole.

Conclusion: Uterine rupture is one of the major obstetric complications which significantly contributes to both maternal and foetal morbidity and mortality. Histopathological examination not only confirms the diagnosis but also highlights other associated confounding features. The findings of the present study would be beneficial for implementing newer obstetric health care strategies.

Background

Uterine rupture during pregnancy or labour is a rare event and frequently results in life- threatening maternal and fetal compromise. In many situations, as the initial signs and symptoms are typically nonspecific, the diagnosis is often delayed for definitive therapeutic management and often results in catastrophic hemorrhage leading to fetal and maternal morbidity and mortality (1). Uterine rupture is defined as tearing/disruption of the uterine wall with or without involvement of the overlying peritoneum (uterine serosa) and fetal membranes (2). It can either occur in women with a native unscarred uterus or in a uterus with a surgical scar. Increased risk of complete rupture is associated with previous caesarean section, preterm delivery, high parity, induced or augmented labour, maternal age, uterine anomalies, abnormal placentation, uterine trauma, abnormal fetal presentation, obstructed labour and instrumentation during labour (1,3,4).

The incidence and the rate of uterine rupture varies in different parts of the world, the variations partly being due to the socio-economic conditions and the availability of health care facilities. In developed countries, the rate of unscarred uterine rupture of 0.012% is lower than 0.11% of developing countries (1). The continuous trend of caesarean deliveries has increased the number of women exposed to the risk of uterine rupture specially in those women with two or more caesarean sections (5, 6). Again studies have also found that the use of prostaglandins for cervical ripening and induction of labour in those cases with prior history of caesarean section had increased rate of uterine rupture (7). So, in this “near miss” maternal event of uterine rupture, peripartum hysterectomy which is a life-saving surgical procedure is usually performed to prevent maternal and neonatal mortality. However, in-spite of all efforts, maternal death as a consequence of uterine rupture still occurs even in developed countries with a rate of 0-1% and an even higher rate of 5-10% in developing countries (8,9).

The aim of study is to evaluate the pathological findings of uterine rupture in peripartum hysterectomy specimens received during an eleven year period.

Material And Method

A hospital based cross-sectional study, for an eleven year period (Jan 2009 to Dec 2019) was carried out in the Department of Pathology , Regional Institute of Medical Sciences , Imphal, Manipur. Hundred and one (101) peripartum hysterectomy specimens were selected and included for the study after obtaining ethical clearance from the institutional ethical committee. Peripartum hysterectomies for non-gestational malignancy and other elective indications or under 24 weeks pregnancy were excluded from the study. From the clinical records available, maternal characteristics like age, parity, relevant gestational and obstetric history, previous cesarean deliveries or any other uterine surgical procedures, ultrasonographic findings like placental site, the indication for the hysterectomy, the operative notes were recorded in a proforma. All the uterine specimens were fixed in 10%

formalin and were weighed and measurements were recorded.

Careful external examination was done for presence of tears, sutures, hematoma, contraction bands etc. are recorded. For the majority of the specimens a complete longitudinal anteroposterior section was usually performed, however few cases required the lateral opening. The uterine cavity was assessed for contents like blood clot, adherent placental tissue or membranes or for ruptured or discontinuous areas. The lower uterine segment was carefully examined for rupture, scars, thinning, incision areas or any other abnormality. Any abnormal area of placentation, hemorrhagic areas or adherent placental tissue or rupture of the uterine wall were identified. The site, laterality, dimensions of ruptured area or adherent tissues were looked for and recorded.

Several tissue sections from the edges of rupture, complete and through and through section of the uterine wall and also from the ragged, irregular haemorrhagic or adherent membrane like tissues were selected and sampled for histopathological processing and paraffin block preparation. The paraffin blocks were sectioned and stained with Hematoxyline & Eosin stain. The slides were studied and the histopathological diagnosis was reassessed. Uterine rupture was diagnosed by a full thickness disruption of the uterine wall with involvement of the visceral peritoneum (uterine serosa). The data were entered into SPSS version 21,0 software. Mean and standard deviation calculated for quantitative variables while percentages and frequencies were calculated for qualitative variables. Relative risk and chi- square test was applied to see the association between uterine rupture and maternal age, multi-parity, site of implantation and previous history of caesarean section . The gross and microscopic histopathological findings were analysed statistically in relation to age, parity, number of previous caesarean sections and other associated comorbid features.

Results

During the eleven year study period, 101 peripartum hysterectomy specimens were received and 18 cases (17.82%) of uterine rupture were diagnosed and studied. The rate of uterine rupture in the present study was 1/4496 births or 0.22/1000 births. The mean age of the uterine rupture cases was 32.66years with majority (72.22%) in the age group of 30-39 years. Considering parity a 100% occurence is seen in multiparous women (2 or more pregnancies). The relation between multiparity and uterine rupture was significant as evidence by the p –value of 0.02(Table-1). Majority (77.7%) showed rupture of the lower uterine segment with lesser fundic (22.3%) rupture (fig-1). The lateral lower uterine segment was the most common site of rupture and in 3 cases the rupture reached upto the cornual end of uterus. Prior history of caesarean section was noted in 5 cases with 3 cases of twice and 2cases of once previous caesarean section. The ruptured/torn areas were irregular, shaggy and haemorrhagic with blood clots in the uterine cavity. Histologically, the normal architecture was distorted and the muscle fibres were disarranged, discontinuous with areas of oedema, haemorrhage and torn blood vessels with fibrin plugs. Fibrotic/scarred areas were more pronounced in the five cases with history of prior caesarean section (fig-2). Other associated findings were adherent placental tissue was seen in 7 (38.8%), abnormal site of placentation in the lower uterine segment 12(66.6%), intrauterine death in 3(16.6%), leiomyoma 1 case, abruption-placentae 1case, infection 2 cases and 1case with features of invasive mole.

Discussion

In a "near miss" maternal event like uterine rupture , peripartum hysterectomy is the only life- saving intervention performed in life threatening obstetric situations to prevent death (10). The rate of peripartum hysterectomy in the present study was 1.24 per 1000 deliveries which was slightly higher than other studies (11), the increased rate may possibly be due to our institute being a referral centre with adequate facility. The frequency of uterine rupture in the present study was 0.02% which was similar to the study of Vernekar M (12) and Rizwan N(13) . The mean age of the 18 cases of uterine rupture was 32.66 years which was comparable with other studies (12,14).

In the current study, uterine rupture was seen in multiparous women (100%) and other studies have also found increasing rupture rates in women with parity two and above (12,13,14). The uterine wall becomes weak due to stretching, tearing or bruishing after repeated childbirth, so the chances of rupture increases with every subsequent pregnancy.

Rupture of the lower uterine segment was seen in majority of the cases (77.7%) and this finding is similar to other studies (12, 14). The differences in the contractility of the upper and the lower segments and hence asynchrony during labour might be responsible for this unpredictable outcome of rupture (15). Nahum GG (1) had opined that uterine scar dehiscence is a more common event which is characterized by disruption and separation of a preexisting uterine scar, the scar being the result of a previous caesarean section or other prior surgeries. Studies have shown increasing incidence of uterine rupture in scarred uterus following previous caesarean delivery (1,2,3,4). In the present study, scarring was observed in 5 cases of uterine rupture with previous history of caesarean section and the correlation was not significant probably due to the lesser number of cases in the study. However, Fitzpatrick et al (3) showed an increased risk of complete uterine rupture after two or more previous caesarean sections and 3 out of 5 uterine rupture cases in our study had prior twice caesarean section. Again, importance of histological examination of the ruptured site was emphasized by Kelehan P et al (16) as few of the expanded, dilated capillaries and venules may be associated with amniotic fluid embolus or with amniotic infusion and local defibrination thereby alerting the obstetrician for further systemic bleeding. Abnormal placentations like placenta praevia (lower uterine segment), placenta accreta, increta and percreta are increasing with the increasing incidence of caesarean section deliveries, so also the incidence of uterine rupture due to the abnormally adherent placenta which fails to separate during delivery. The role of uterine anomalies, scarring due to previous surgery, uterotonic agents, cervical ripening prostaglandins etc. in causing uterine rupture have been extensively reviewed by Nahum et al. (1). Perinatal mortality was seen in 3 cases and uterine rupture is an independent risk factor for perinatal mortality (4). Uterine rupture is a complication that can be eliminated under conditions of best obstetric practice. Regular antenatal care, hospital deliveries and vigilance during labour with quick referral to a well-equipped center may reduce the incidence of this condition (17,18)

From a histopathologic perspective, a pathologic diagnosis is important so as to explain the indication of the peripartum hysterectomy and also to highlight the cause of the hemorrhage. Again the pathological diagnosis would also confirm the clinical or the imaging impression of the case. Unexpected associated findings are also diagnosed during histopathological

examination, which gives an insight to this dreaded complication. Further studies on abnormal placentation in the lower uterine segment and its association with uterine rupture and other obstetric complications is required in understanding the pathophysiology of these obstetric events.

Conclusion

Uterine rupture is one of the major obstetric complications which significantly contributes to both maternal and foetal morbidity and mortality. In the present study, multiparity was the most significant risk factor associated with uterine rupture. Lower segment uterine rupture was more common than fundic rupture. Abnormal placentation in the lower uterine segment increases the risk of rupture. Histopathological examination not only confirms the diagnosis but also highlights other associated confounding features. The higher rate of occurrence of histologically proven uterine rupture in the current study is a reflection of the prevailing healthcare facility in the peripheral region. Innovative strategies are needed to address this problem.

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Legends Table and Figure

Table 1: Relationship of Parity and uterine rupture .

No. of Parity	Rupture uterus		Total (%)	Chi-square (P-value)
	No (%)	Yes (%)		
1	20(100.00)	0(0.00)	20(19.80%)	(0.026)
2	30(88.24%)	4(11.76%)	34(33.66%)	
3	21(67.74%)	10(32.26%)	31(30.69%)	
4	5(71.43%)	2(28.57%)	7(6.93%)	
5	3(60.00%)	2(40.00%)	5(4.95%)	
Total	83(82.18%)	18(17.82%)	101(100.00%)	

Fig. 1: Gross picture of peripartum hysterectomy specimen showimg rupture at the lower lateral uterine segment.

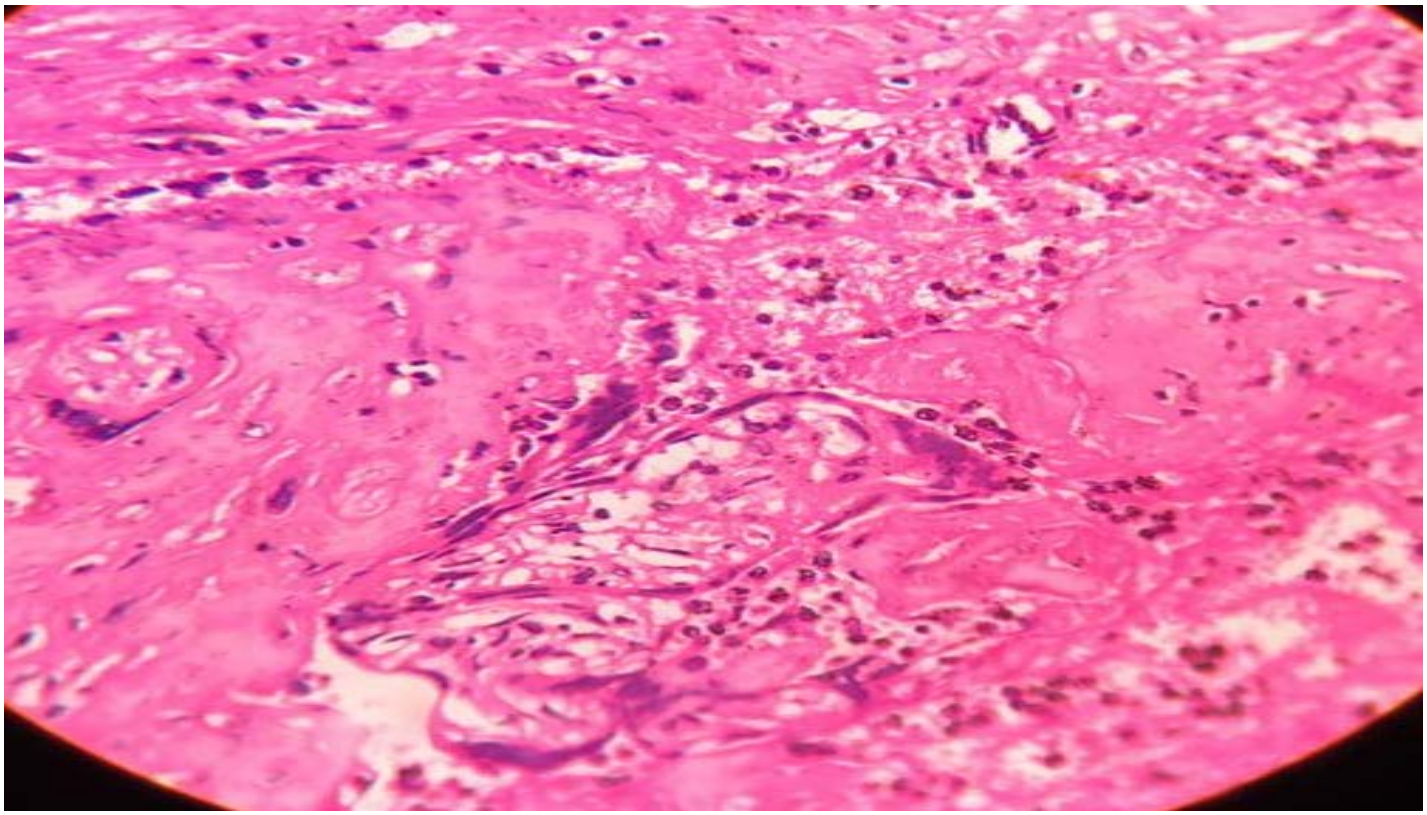

Fig. 2 : Section of the lower uterine segment showing trophoblastic tissue implanting on the fibrocollagenous scar (400X, H&E stain)