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CLINICAL ARTICLE

Uterine rupture in Mekelle, northern Ethiopia, between 2009 and 2013

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ABSTRACT

Objective: To review cases of uterine rupture at a center in northern Ethiopia. *Methods:* In a retrospective chart review, data were assessed for cases of symptomatic uterine rupture treated at Ayder Referral Hospital in Mekelle between January 1, 2009, and December 31, 2013. *Results:* In the 5-year study period, there were 5185 deliveries and 47 cases of uterine rupture, giving a rate of one case per 110 deliveries. All patients underwent laparotomy for suspected uterine rupture. Mean parity was 3.6 (range 0–8). The most common predisposing factors were cephalopelvic disproportion (35 [74%] patients), previous cesarean delivery (5 [11%]), and fetal malpresentation (4 [9%]). Hysterectomy was undertaken for 35 (74%) patients; the other 12 (26%) were treated conservatively by simple repair of the rupture. There were 44 (95%) stillbirths and 1 (2%) maternal death. *Conclusion:* Uterine rupture remains an important clinical problem in northern Ethiopia. Changes in the cultural preference for home delivery, better transport and referral systems, and improved obstetric training and hospital management of laboring women are needed.

1. Introduction

Uterine rupture is a rare but catastrophic obstetric occurrence. As Turner commented, "Rupture of an unscarred uterus is rare, usually traumatic, and its incidence decreases with improvement in obstetric practice" [1]. In high-resource countries with affluent populations and well developed systems of obstetric care, rupture of the uterus during labor almost always occurs when the uterus is scarred by a previous cesarean delivery or gynecologic surgery [2–4]. In a 12-year review of 188 819 deliveries at Los Angeles County–University of Southern California Women's and Children's Hospital, USA, only 13 uterine ruptures occurred among women with an unscarred uterus. Three of these cases involved motor vehicle accidents; there were only 10 ruptures of a previously unscarred uterus during labor, yielding a rate of one uterine rupture per 16 849 deliveries [5].

Rupture of the uterus in primigravida during labor is even rarer [6]. A systematic review by WHO [7] found that, in high-resource countries, the risk of uterine rupture during labor was approximately 1% for a woman with a previous cesarean delivery, and negligible (0.006%) for a woman with an unscarred uterus. In the resource-poor countries of Sub-Saharan Africa, by contrast, uterine rupture is common and often fatal. In this setting, rupture of an unscarred uterus commonly occurs owing to prolonged obstructed labor, undiagnosed or mismanaged fetal malpresentation, injudicious use of oxytocin, aggressive and unwise obstetric manipulations (often carried out by untrained birth attendants or physicians with inadequate experience), transportation deficiencies, and hospitals that are poorly staffed and badly equipped to handle obstetric emergencies [8–16].

Ethiopia has high rates of maternal mortality and morbidity, with many cases involving uterine rupture [17–20]. In Ethiopia as a whole, only 10% of women deliver in a healthcare institution [21]. Obstructed labor is common, hospitals are not widely distributed, transportation in many parts of the country is poor, and cultural traditions encourage women to deliver at home. In the Amhara Region of Ethiopia, the incidence of uterine rupture was found to be as high as one in every 26 deliveries [19].

Ayder Referral Hospital is located in the city of Mekelle, the capital of Tigray Region, in northern Ethiopia. The hospital is the tertiary referral center for 8 million people. Ayder Referral Hospital is affiliated with the College of Health Sciences at Mekelle University and is an academic center for residency training in obstetrics and gynecology. The School of Medicine at Mekelle University is relatively new; its first class graduated in 2010. Residency training in obstetrics and gynecology did not start until January 2013. Although Ayder Referral Hospital only opened in 2008, it is now the second-largest hospital in Ethiopia with 500 beds, 96 of which are reserved for obstetrics and gynecology. Since it opened in 2008, the hospital has averaged over 1000 deliveries per year, but this number is increasing.

Against this clinical background, the aim of the present study was to conduct a 5-year retrospective review of cases of uterine rupture at Ayder Referral Hospital, review clinical outcomes (both maternal

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and fetal), and use the information obtained to improve current obstetric practice.

2. Materials and methods

In a retrospective chart review, data were assessed for all cases of symptomatic uterine rupture treated at Ayder Referral Hospital between January 1, 2009, and December 31, 2013. Cases of asymptomatic cesarean scar dehiscence found incidentally were excluded. Ethical clearance for the review was obtained from the Institutional Review Board at Ayder Referral Hospital. Because the study was a retrospective chart review, informed consent from patients was not required.

The hospital records were reviewed and relevant clinical information was retrieved from the charts in a standardized fashion, including fetal outcomes and the occurrence of maternal anemia, sepsis, blood transfusion, wound dehiscence, vesicovaginal fistula formation, and maternal mortality.

For the present descriptive study, the data are reported as simple statistics (number and percentage).

3. Results

During the 5-year study period, there were 5185 deliveries and 47 cases of uterine rupture, giving an incidence of one case per 110 deliveries. All 47 patients presented with signs and symptoms suspicious of uterine rupture.

Of the 47 women with a clinical diagnosis of uterine rupture, only 5 (11%) had undergone previous cesarean delivery. At laparotomy, 6 (13%) ruptures were found to be incomplete, two of which showed symptomatic dehiscence of a previous cesarean scar. The other 4 patients with incomplete rupture had not had a previous cesarean delivery and were found to have a rupture of the underlying uterine muscle but an intact serosal layer overlying the injured myometrium. The remaining 41 (87%) cases were complete, full-thickness uterine ruptures.

The mean age of patients with uterine rupture was 30.3 years (range 18–45). The mean gravidity was 4.7 (range 1–8), and the mean parity was 3.6 (range 0–8). Thirty (64%) patients had received some prenatal care, but 17 patients (36%) had received none at all. Because almost all patients were referred from other health centers, it was difficult to ascertain the exact duration of labor owing to the poor quality of records accompanying these women. On the basis of documentation in the medical charts of the patients' recollections of how long they had experienced "pushing down pains" at home before seeking care, the mean duration of labor before referral was estimated to be 17.4 hours (range 3–36).

Almost all patients presented with the classic triad of abdominal pain, cessation of uterine contractions, and fetal parts palpable through the abdomen (Table 1). Three-fifths of women presented with vaginal bleeding and more than one-third were initially in shock (Table 1).

The cause of uterine rupture was previous cesarean delivery for 5 (11%) women, cephalopelvic disproportion for 35 (74%), fetal malpresentation for 4 (9%), and oxytocin use for 3 (6%). One case of oxytocin-associated uterine rupture involved aggressive use of oxytocin for a multiparous patient with prolonged rupture of membranes; one involved prolonged use of oxytocin for a woman with an intrauterine fetal death and a fetus in a breech presentation; and the other involved prolonged administration of oxytocin to a woman with a known hydrocephalic fetus. None of the women with oxytocin-associated uterine rupture had undergone a previous cesarean delivery. In no cases of uterine rupture had prostaglandins been used.

Only 1 (2%) patient was from the city of Mekelle; the rest were referred from outlying areas of Tigray. In 44 (94%) cases, uterine rupture occurred before arrival at Ayder Referral Hospital. Three (6%) cases of uterine rupture occurred at Ayder, all of which involved inappropriate use of oxytocin. The mean time of transportation to Ayder Referral Hospital from the referring center was 1.3 hours (range 0.5–4.0).

All patients with a clinical diagnosis of suspected uterine rupture were managed by laparotomy. Once the diagnosis of suspected or impending uterine rupture was made, the interval from decision to incision was short, occurring in all cases in less than 1 hour. Two-thirds of the ruptures involved the anterior lower uterine segment (Table 2). Extension of the rupture into the vagina occurred in 11 (23%) cases; in 4 (9%) cases, the rupture also involved the bladder. In 3 (6%) cases the rupture was compound: one involved both the anterior and posterior uterus, one the left lateral and posterior uterine walls with a large hematoma of the sigmoid colon, and one the lower anterior segment and lateral uterine wall (side unspecified in the operative note). There were no cases of fundal rupture.

The type of operation was chosen by the surgeon (not by formal protocol), taking into consideration the extent of the rupture, presence of uterine necrosis, patient hemodynamic status, parity, and number of living children. Overall, 35 (74%) cases were managed by hysterectomy; the rest were managed conservatively by simple suture repair of the rupture (Table 3). In 6 (13%) cases, supracervical (rather than total) hysterectomy was performed as a quicker and less time-consuming operation for unstable patients. In 3 (6%) cases, concurrent tubal ligation was performed. The mean operating time was 63 minutes (range 30–140); the shorter times reflected conservative management by repair rather than uterine extirpation. Blood transfusion was necessary in the immediate perioperative period for 38 (81%) patients (mean 2.2 units per case [range 1–4]).

There were three major intraoperative complications: one case of bladder injury (repaired intraoperatively), and two ureteric injuries. One ureteric injury was detected intraoperatively and repaired by immediate reanastomosis. The other injury was not recognized until the following day, when the patient underwent repeat surgical exploration and reanastomosis of the injured ureter.

All patients received perioperative antibiotic treatment with ceftriaxone and metronidazole as per standard Ethiopian national practice, initially intravenously and then orally to complete a treatment course of 10–14 days. All patients were catheterized postoperatively, generally for 1 week (mean duration of catheterization 7.1 days [range 3–14]). One (2%) patient developed a pelvic abscess, which resolved with antibiotic treatment and did not require drainage. Six (13%) patients developed postoperative pneumonia, and 1 (2%) patient developed a urinary tract infection. One patient with uterine rupture extending into both the vagina and the bladder underwent intraoperative repair of these injuries and was catheterized for 14 days postoperatively, but nonetheless developed a vesicovaginal fistula.

Mean hospital stay was 9.6 days (range 6–41). The patient who was hospitalized for 41 days was an outlier whose clinical course was complicated by major wound problems, including two fascial dehiscences that required reoperation and reclosure.

Table 1
Presenting signs and symptoms of uterine rupture (n = 47).

Presenting sign or symptom	No. (%)[a]
Abdominal pain	45 (96)
Cessation of uterine contractions	42 (89)
Fetal parts palpable through the abdomen	39 (83)
Vaginal bleeding	28 (60)
Clinical shock	18 (38)

[a] Many women presented with more than one sign or symptom.

Table 2
Sites of uterine rupture (n = 47).

Site of rupture	No (%)
Lower anterior uterine segment	30 (63)
Left lateral uterus	8 (17)
Right lateral uterus	3 (6)
Posterior uterus	3 (6)
Compound sites of rupture	3 (6)