

Bovine Uterine Torsion: A Review Illustrated by Cases from the Western College of Veterinary Medicine Large Animal Clinic

Jane Manning, Patty Marsh, Frank Marshall, Rob McCorkell,
Barb Muzyka and Dennis Nagel, *Class of 1983*
Western College Veterinary Medicine
University of Saskatchewan
Saskatoon, Saskatchewan, Canada
S7N 0W0

INTRODUCTION:

Uterine torsion may occur in all species of animals. However, it is most commonly observed in the bovine as one of the etiologies of dystocia (4). Arthur (1) defines uterine torsion as a rotation of the uterus about its longitudinal axis with a twisting of the anterior vagina.

The reported occurrence of uterine torsion varies greatly from country to country. Sloss and Dufty (5) stated that the rate ranges from 1 to 3% in Australian dystocias. Roberts (4) reported a 7.3% occurrence among 1555 dystocias treated over a ten-year period in the Ambulatory Clinic of the New York State Veterinary College and Morten and Cox (2) reported a 5-6% rate in dystocias in some areas in Britain. In Veterinary hospitals to which more severe types of dystocia are referred, irreducible uterine torsions were an indication for Caesarean section in from 13.8-26.5% of cases (3).

ANALYSIS OF CASES:

From 1968 to 1981, 131 cases of uterine torsion have been treated by the clinicians of the Large Animal Medicine and Surgery Department and Ambulatory Clinic of the Western College of Veterinary Medicine; 91 of 2834 dystocias were treated in the Large Animal Clinic, 40 of 858 dystocias were treated by the Ambulatory Clinic. These figures perhaps do not accurately reflect uterine torsions as a cause of dystocia, simply because the figures do not include dystocia management by local practitioners in the Saskatoon area that often were referred for Caesarean section to WCVM's Large Animal Clinic.

The recorded data was incomplete, therefore, 25 of the 131 cases were omitted for lack of sufficient data. Thus our gathered data is an accumulation of information with varying degrees of completion.

This paper completed by students of the 1983 class to fulfill the requirements of a task assigned by Dr. E. D. Janzen, Department of Herd Medicine and Theriogenology.

DIRECTION OF TORSION:

In 81 animals for which detailed information was recorded, the torsion on vaginal and rectal examination was clockwise (to the cow's right) in 22 cases, and anti-clockwise (to the cow's left) in 59 cases. This majority of anti-clockwise torsions is also reported by other authors. Pearson (3) recorded 79 anti-clockwise and 39 clockwise torsions. Morten and Cox (2) recorded 5 anti-clockwise and 2 clockwise torsions. Roberts (4), however, suggests that in his findings there was a preponderance of clockwise rotations due, probably, to the rumen occupying the left side of the abdomen.

DEGREE OF TORSION:

In only 54 cases was degree of torsion accurately recorded. The breakdown was recorded to the nearest quadrant in Table I. Arthur (1) cites Wright who stated that the most common degree of torsion was in the order of 90° to 180°. Pearson (3) found that in only 37 cases was the amount of rotation 180° or less, while in the majority (0/88), the degree of torsion was 360°. Pearson also cited a record of 180° torsion.

ASSOCIATION WITH PARTURITION:

The majority of cases were presented as dystocias. In no cases were torsions recorded before term. Two animals were recorded as being overdue, one by ten days and the other by three weeks. Thus our data supports the theory that the inciting cause of torsion operates during the first stage of labor.

Where labor length was recorded, 63% of cases were greater than eight but less than twelve hours, and 21% were greater than twelve hours.

Table I: Frequency Distribution of the Degree of Torsion Recorded by Clinicians of the WCVM's LAC.

| Degree of Torsion | Number | % |
|-------------------|--------|----|
| 90° | 8 | 15 |
| 180° | 25 | 46 |
| 270° | 12 | 22 |
| 360° | 6 | 11 |
| 360° | 3 | 5 |

Cervical dilation is a good indication of the association of torsion with parturition. Details of cervical dilation were recorded in only 39 cases; 32 records indicated that cervical dilation was present before and/or following detorsion.

AGE AND BREED:

Attempts were made to illustrate Roberts' (4) contention that torsion is observed more frequently in pluriparous versus primiparous animals. The figures in Table II indicate the occurrence of uterine torsion by age groupings.

These figures, however, do not support Roberts' contention. Data derived from Pearson's study (3) indicated that 124/168 cases were less than or equal to 3 years; 33 cases were less than or equal to 5 years, but greater than 3 years, and 11 cases were greater than 5 years. Pearson points out that his figures merely reflect the relative number of animals at risk to dystocia in the cow population. The cases at the WCVm perhaps illustrate this point.

Table II: Occurrence of Uterine Torsion as Distributed by Age Groupings and WCVm's LAC in 107 Recorded Cases.

| AGE | PERCENT |
|-----------|---------|
| 3 years | 38.8 |
| 3-5 years | 30.8 |
| 5 years | 30.8 |

Roberts (4) indicates that uterine torsion is most commonly observed in dairy cattle. However, data from this study merely reflects the breed proportions in WCVm practice area Table III. Pearson's survey (3) supports this finding.

METHOD OF CORRECTION AND FETAL & MATERNAL FATALITY RATES:

In only 96 cases was the method of correction recorded. In this survey the most common method of correction employed was a laparotomy with detorsion prior to caesarian section (63.5%). In only 50 of the 61 cases, were details of fetal fatality indicated: 27 dead, 23 alive. There were three maternal deaths recorded. Understandably, prognosis for the calf and dam are limited for any correction method by the degree and duration of uterine ischemia, edema and necrosis.

Correction per vagina was performed in 23 of 96 cases. Only 22/96 cases recorded details of calf fatality: 11 dead, 11 alive. There was only one recorded maternal fatality. The detorsion bar was employed in 7 cases, only 5 give details on calf mortality: 3 dead, 2 alive, one calf was euthanized due to bilateral comminuted fractures of the metacarpals. Rolling was used in 5 cases, with only 2 calf fatalities. In two of these cases the Modified Schafer's method was used (*see Treatment*).

ETIOLOGY:

There are conflicting views as to the exact etiology of uterine torsion. However, there is agreement that uterine torsions do occur in association with, or as a complication of, late first stage or early second stage parturition. It was found that prior to or following detorsion, the cervix was almost always some-

what dilated (1, 3, 4, 5). Roberts (4) suggests that although unusual, there are reports of uterine torsions occurring throughout gestation, that is, from seventy days on. The torsion may remain in this state for days or weeks without clinical symptoms until labor begins and dystocia results. If severe enough (greater than 180°) secondary complications of congestion and edema of the uterus with subsequent fetal death or uterine rupture can occur. Our survey recorded the delivery of one live extrauterine fetus as a result of uterine rupture due to the torsion prior to term.

Table III: Breed Distribution of 107 Uterine Torsions Managed by LAC Clinicians at WCVm.

| BREED | PERCENT |
|-------------------|---------|
| Holstein Friesian | 71.5 |
| Hereford | 11.2 |
| Charolais | 10.2 |
| Simmental | 1.8 |
| Brown Swiss | 1.8 |
| Aberdeen Angus | 1.8 |
| Shorthorn | 0.9 |

There is a conglomerate of predisposing factors for uterine torsion in the bovine. Each of these factors seemingly act by increasing the mobility of the uterus in some manner. The most important contributing factor is that of uterine instability (5). Certain anatomic characteristics of the suspension of the uterus are such that each uterine horn is supported in a dorsolateral subilial direction by the broad ligaments. The broad ligament is, however, attached to the ventral surface of the uterine body and horns. It appears that during pregnancy the gravid horn grows beyond the relatively stable area of attachment and is then left supported by the rumen, intestine and abdominal wall. The non-gravid horn creates an asymmetrically distended uterus, further adding to the instability. Arthur (1) points out that bicornually disposed bovine twins would appear to stabilize the parturient uterus and this is supported by the rarity of torsion in twin pregnancy. Much controversy exists as to which direction each horn will rotate when gravid. With the anatomic uterine instability, one would generally expect the gravid to roll toward and over the non-pregnant horn (5). Many authors argue this point, suggesting clockwise rotation was invariably associated with right horn pregnancy, and anti-clockwise torsions with left horn pregnancy.

Given uterine instability, it follows that there should be some parturient factor to cause the torsion, otherwise torsion would more frequently be observed in advanced pregnancy rather than at parturition. Several authors suggest that parturient fetal movements are a precipitating factor. These postural adjustments occur during the late first and early second stages of parturition in response to the myometrial contractions (1, 3, 5).

Decreased intrauterine fluid has been suggested to lead to an atonic, long gravid uterus. This allows an increased fetal-

uterine wall contact and then with the increased mobility, the uterus is even more prone to torsion (5).

It has also been suggested that the way in which a cow rises with its rear end first allows the viscera to move cranially, leaving the uterus hanging from the pelvis. Thus, with any sudden movements, like slipping or being pushed or bunted, uterine torsion can result (4).

SYMPTOMS:

Uterine torsion is predominantly a complication of first and second stage labor (as outlined previously), therefore, the symptoms due specifically to the torsion can be observed only in animals that are not yet parturient. In our survey, it appeared all cases were parturient as all were presented for dystocia.

Sloss and Dufty (1980) suggested that if torsion does occur prior to term, the cow may behave normally, or if severe enough, she may show signs of colic. Pearson (3) recorded a case of torsion prior to term, in which the cow had two complete revolutions of the uterus, colic, kicking at the abdomen and paddling with the hind legs. There was also anorexia, constipation, tachycardia and a very noticeable depression of the lumbar spine.

When torsion occurs during parturition, restlessness and perhaps straining usually cease. Pearson (3) points out that the fetal membranes often remain intact and do not appear (even in protracted cases). This suggests that torsion causes partial or complete uterine inertia. He also states that uterine torsion is the only form of dystocia in cattle in which the fetus may die with both placental membranes intact and placental cotyledons totally separated.

If the parturient torsion is unrelieved, the cow will develop persistent low grade abdominal pain, progressive anorexia and constipation. The uterus becomes severely congested and edematous, the placenta separates from the uterus and the fetus dies. Thrombosis of uterine arteries is common after prolonged torsion and may lead to necrosis and rupture of the uterus. If this occurs, maternal death results from toxemia, peritonitis, hemorrhage and shock. Our study recorded only 3 maternal deaths following detorsion, but often it was noted that the cows appeared in shock.

DIAGNOSIS:

The diagnosis is based on findings of vaginal and/or rectal examination. The stenosed anterior vagina is readily palpable and if the torsion is less than 180°, the cervix may admit a hand. The vaginal mucosa forms spiral folds, which become tauter nearer the cervix. The direction of the folds indicates the direction of the torsion (Figure 1). The degree of rotation can be assessed by vaginal examination. It is suggested that if the torsion exceeds 360°, it is difficult or sometimes impossible to admit a hand through the twisted portion (5).

Arthur (1) suggests that where the twist is cranial to the cervix, the vagina is much less involved and diagnosis is only by palpating per rectum. Personal communication with the Western College of Veterinary Medicine clinicians indicates that per rectum, one can feel "cording" of torsed parts of the uterus, and then the uterus seemingly rolls off to one side or the other. One can also palpate the mid-uterine artery stretched across the uterus in an abnormal fashion. The broad ligaments are very taut and, for example, in right torsion, the

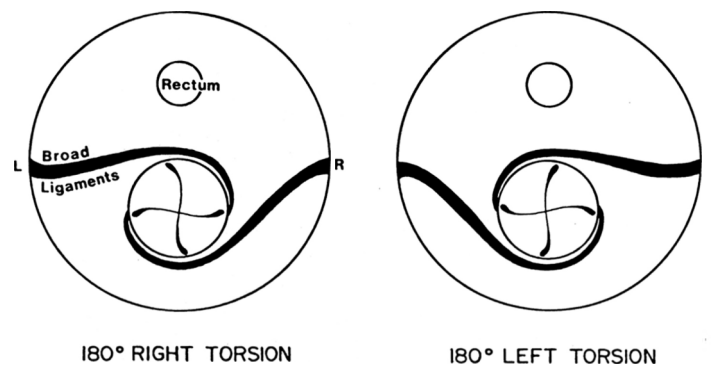


Figure 1: Diagram of the twisted bovine uterus and vagina, illustrating twisting of broad ligaments and the spiraling folds in the vagina. (Adapted from Roberts 1971)

right broad ligament is pulled strongly downward and under the twisted uterine body or vagina.

In our study, diagnosis of direction per rectum and vagina was confirmed by laparotomy findings. Only 35 case reports recorded direction of torsion at laparotomy and only 5 indicated an incorrect direction had been diagnosed by rectal and vaginal examination.

TREATMENT PROCEDURES:

A number of methods have been described for the correction of uterine torsion. The method chosen will depend on the degree of torsion, the stage at which the torsion is detected, and the condition of fetus, uterus and the dam.

MANUAL DETORSION PER VAGINA:

This is the most common way of relieving the torsion, as most torsions are less than 270° (3, 4). This allows passage of the hand through the crevix to grasp the fetus. A swinging motion is created, and eventual rotation is attempted in the opposite direction of the torsion. External ballotment of the flanks of the cow may aid in reduction of the torsion, for example, in a right torsion, a person on the right side pushes down and inwards on the upper right flank, while another person on the left pushes upwards and inwards, on the lower left flank (5).

THE DEMOTT DETORSION ROD:

This method described by Roberts (4) is indicated when correction is not possible by manual rotation of the fetus and uterus. The detorsion rod is made of 3/8 inch steel, approximately 30 inches long, has an eye at either end with a 1-1/2" inside diameter.

A loop is made in an obstetrical chain and the end of the loop is passed through one eye of the detorsion bar. Once this is carried into the uterus, the free end of the chain is passed around one leg of the fetus above the hock or the carpus and the loop is passed around the opposite leg. The chains are snugged down and a handle is inserted into the other eye of the rod. The chain is tightly drawn and wrapped around the handle (Figure 2). The calf and uterus are rotated in an opposite direction to the torsion. This method is more difficult and has obvious inherent dangers.

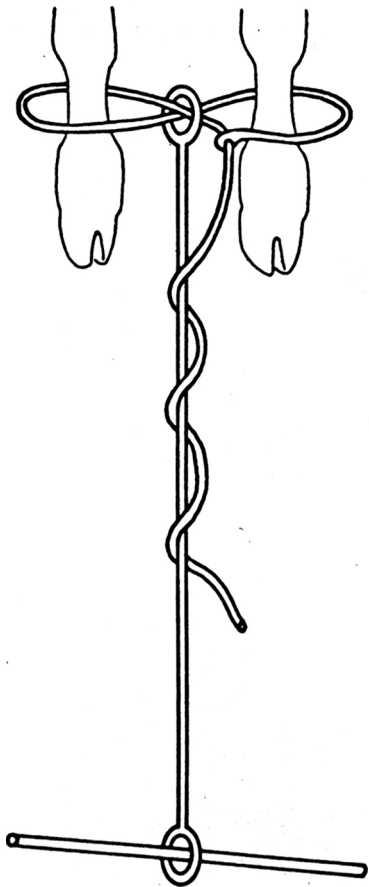


Figure 2: Diagrammatic representation of Detorsion Rod, obstetrical chain, and calf's legs.

DETORSION BY ROLLING THE COW:

Rolling the dam is one of the oldest and simplest methods used to relieve uterine torsion. It requires a minimum of 3 people on ropes, and is recommended for preparturient torsions. The idea is to roll the cow rapidly in the direction of the torsion. The inertia of the gravid uterus, created by the rapid rotation, allows the cow to be rotated about the uterus (Figure 3).

Sedation prior to casting on a suitable, well-bedded site may occasionally be necessary (4). Prior to rolling, the cow is laid down in lateral recumbency on the same side as the direction of the torsion.

SCHAFFER'S MODIFIED ROLLING TECHNIQUE:

This method, as described by Arthur (1) entails application of a wide plank (20-30cm wide by 3-4 meters long), to the flank of the cast cow, the one end resting on the ground. A 60 kg assistant stands on the plank, while the cow's body is slowly turned by pulling leg ropes (Figure 4). The advantages of this technique are that the plank fixes the uterus, while the cow's body is rotated, and because the cow is turned slowly, less assistance is required. It is also easier for the veterinarian to check the correction per vagina.

It should be noted that while rolling is in progress the person squatting on the board gradually changes position so that full weight is always centered on the point where the board touches the abdomen of the cow.

SURGICAL CORRECTION:

A laparotomy, with or without caesarean section, is indicated if the torsion is irreducible by the previous methods, or when the cervix is insufficiently dilated and dilates no further after detorsion.

Figure 3: Diagnostic representation of the Rolling Method for correction of a right torsion.
a) Cow is in right lateral recumbance
b,c,d) Cow is rapidly rolled to the right through 180 around the uterus.

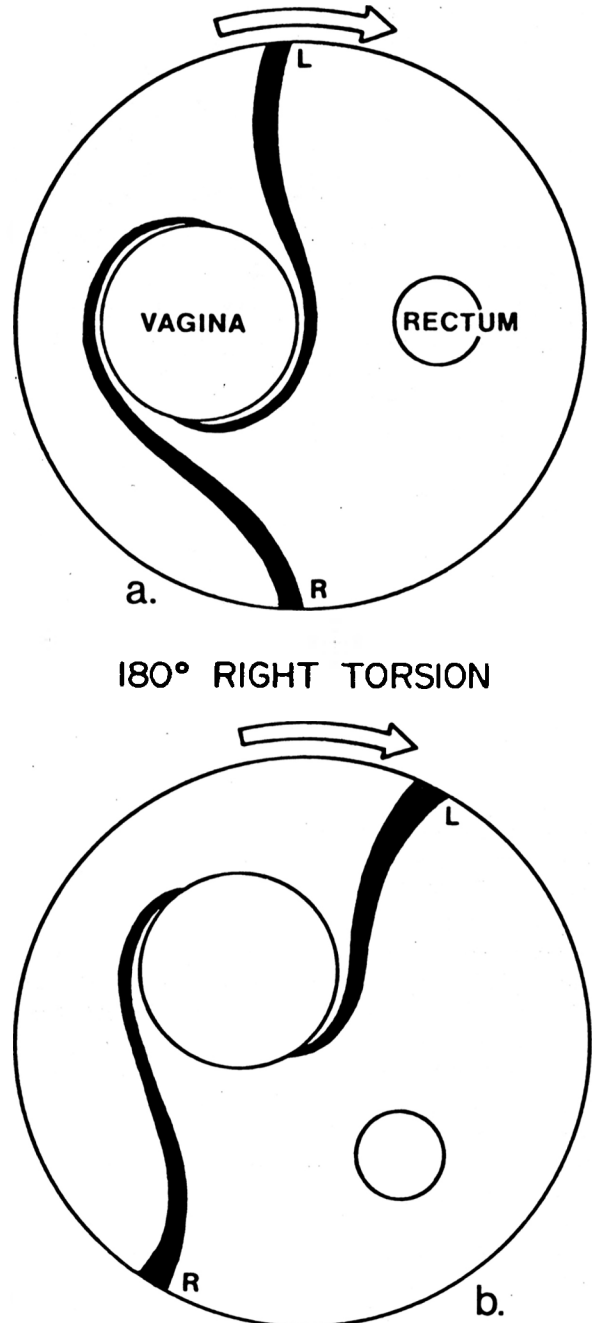
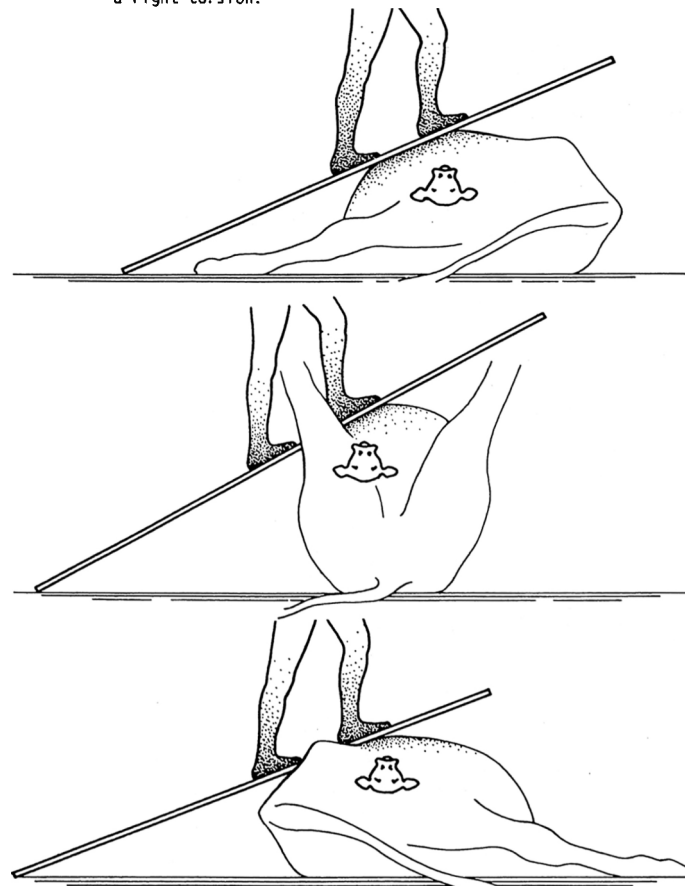
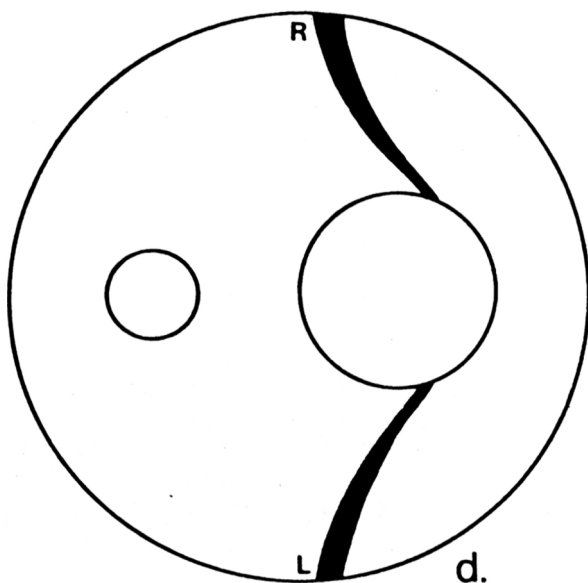
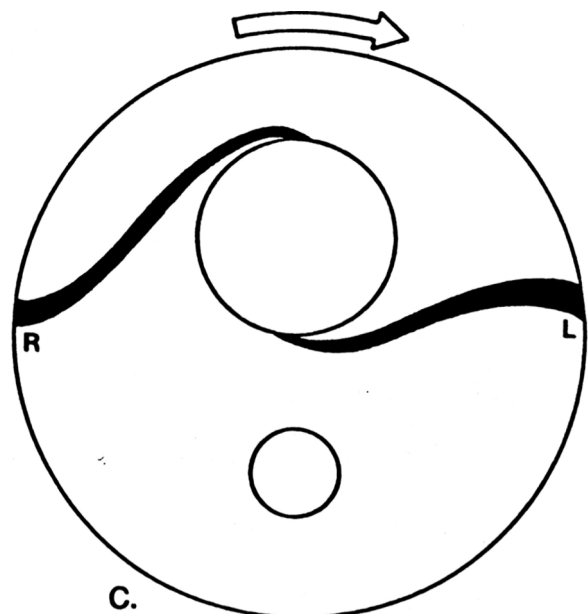


Figure 4: Diagrammatic representation of Modified Rolling Technique: Schaffer method (Arthur 1965), illustrating correction of a right torsion.



CONCLUSION:

In conclusion, then, our WCVI survey produced 91 uterine torsions out of 2834 dystocias. The most common degree and direction of torsion was found to be 180° and anti-clockwise. In those cases recorded, laparotomy findings showed a positive correlation with field diagnosis and a 50% calf fatality rate was observed overall.

Generally, cervical dilation was an indication of the association of uterine torsion with parturition, but in our study, only 39-107 cases recorded information. Exact time for labor length was often only a rough estimate, however, 63% of cases were found to be within the range of 8-12 hours. We found no evidence supporting the theory that uterine torsion occurs more often in older cows, and as far as breed was concerned, the majority of cases reflected the predominant breed represented by the WCVI practice, Holstein.

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Arthur (1975) describes the left or right sublumbar fossa approach on the standing cow, to attempt to rotate the uterus intra-abdominally. A Caesarean section may be required before detorsion, as in cases where the cervix will not dilate and it is desired to save the live fetus. Owing to the edema of its walls, the uterus is unusually friable, and the intra-abdominal manipulations must be done carefully. Following detorsion, the fetus may then be removed by traction if the cervix will allow it, or failing that, by Caesarean operation. It is desirable to correct the torsion first before incising the uterus (3). This relieves any intestinal displacement and enables better accessibility to the uterus for the incision and suturing. Pearson (3) also reported that Caesarean section was carried out on 137 of 168 uterine torsion cases, with a maternal recovery rate of 95%. It was noted that the placenta was either already detached at the time of operation, or was passed soon afterwards and that uterine involution was rapid.