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ORIGINAL ARTICLE

Outcomes following surgical repair using layered closure of unrepaired 4th degree perineal tear in rural western Uganda

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Abstract
Introduction In many rural low-income countries, perineal tears at time of vaginal birth are not repaired at time of delivery. The aims of this study are to describe the surgical technique for management of the unrepaired 4th degree tear, performed without flaps, and short-term follow up on anal incontinence symptoms using a validated questionnaire.
Methods Women presenting to fistula camps in western Uganda with unrepaired 4th degree tears were interviewed using the Cleveland Clinic Continence Score. Interviews were undertaken pre-operatively, at 4–6 weeks post-operatively and 12 months following surgery. Repair of the 4th degree tear was performed in layers, with an overlapping anal sphincter repair and reconstruction of the perineal body, without flaps. All women were examined prior to discharge.
Results 68 women completed pre-operative Cleveland Clinic Continence Scores. Prior to surgery, 59 % of women complained of daily incontinence to solid stools. Over 70 % of women complained of restriction to lifestyle due to the unrepaired 4th degree tear. About 50 % of the women are rejected by their husbands because of the condition. Only 1 woman had wound breakdown on Day 2. At 4 to 6 weeks follow-up, 61 women were contacted and all reported perfect continence.
Conclusion This study highlights the hidden problem of unrepaired 4th degree tears in rural areas of low-income countries where most deliveries are undertaken in the village without professional health care workers. These tears have significant impact on quality of life and anal incontinence. Short-term outcomes following surgical repair using a layered closure are promising.

Keywords Surgery · Unrepaired 4th degree perineal tear

Introduction

The management of the acute perineal tear at time of vaginal delivery has been studied with guidelines readily available [1]. The rate of 3rd and 4th degree perineal tears varies in the literature from less than 1 % and up to 9 % [2, 3]. The risk of a 4th degree perineal tear also varies between 0.03 and 0.2 % of all vaginal deliveries [4–7]. To date, there has been a paucity of data on the repair of the unrepaired 4th degree tear in a low-income country. A study on the prevalence of perineal tears in developing countries demonstrated a large variation from 0.1 to 15 % of vaginal deliveries [8]. However, there was no separation between 3rd and 4th degree tears with the prevalence given as a combination of both types of anal sphincter injuries.

The unrepaired 4th degree tear is uncommon in high-income countries as the injury is diagnosed in the birthing suite and repaired soon after. In many parts of low-income countries, women do not deliver in health care centres but in their local villages. In the villages, there is usually no infrastructure available to assist the women with the repair of any perineal tears. These tears are left to heal spontaneously by secondary intention.

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There are some studies on cloacal-type deformities, usually from breakdown of the primary obstetric repair, anorectal surgery, other injuries and congenital anomalies [9–11]. Many surgical techniques have been described to manage these deformities. Some authors have advocated faecal diversion [9], tissue flaps [12, 13] or leaving a perineal defect for drainage [11, 14] as routine, while others have stated diversion [10, 11] or tissue flaps [9] are unnecessary.

The aims of this study are to describe the surgical technique for management of the unrepaired 4th degree tear, performed without flaps, and short-term follow up on anal incontinence symptoms using a validated questionnaire. This technique, in particular without large tissue flaps and faecal diversion, is well suited in low resource settings.

Methods

The study was undertaken during 2 separate fistula camps (18–29 December 2013 and 3–14 October 2015) at the Kagando Hospital, western Uganda. As there was no local Ethics committee at Kagando Hospital, approval was obtained from the Ethics committee at the Greenslopes Private Hospital.

All women with a chronic/unrepaired 4th degree perineal tear were invited to participate in the study. Radio announcements in the local languages were made to notify women of the services and dates of the camps. The service was provided without charge to the women whether they enrolled in the study or not. This included surgical repair, hospital, food and transportation costs. The procedure, post-operative care and risks were explained to the women in their local language and as many women were illiterate and could not sign the consent form, their thumbprints were utilised.

Interviews, including the Cleveland Clinic Continence Score were undertaken pre-operatively and then at 4–6 weeks post-operatively and 12 months following surgery. The Cleveland Clinic Continence Score comprises of 5 questions – solid stool leakage, liquid stool leakage, gas/flatus leakage, use of pads for stool leakage and lifestyle restriction. For each question, the score ranges from 0 to a maximum of 4. When the answer to the question is 'never' the score is 0, 'rarely less than once a month' the score is 1, 'sometimes less than once a week' the score is 2, 'usually less than once a day' the score is 3 and 'always everyday' the score is 4. Therefore, a score of 0 indicates perfect anal continence without use of pads and the maximum/worst score is 20.

In our study, the score was modified to 4 questions instead of 5 and therefore the maximum score was 16 instead of 20. Thus, a score of 16 in this study indicates the worst score and a score of zero indicates perfect continence. The question on pad use for faecal incontinence was not used as continence pads are not used/available in rural Uganda and in any case, the costs would be prohibitive for villagers who earn less than US$2 a day. Interviews were performed by one of 2 experienced fistula nurses (HN, IS) in their local language with responses documented in English. Follow-up interviews were undertaken via telephone by nurse HN. The women were unable to return to the hospital due to monetary constraints, fear for personal safety during travel and/or did not receive permission from their families.

Surgical technique

All surgeries were performed by or under the supervision of JG and HK. Bowel diversion was not performed on any woman. Pre-operative bowel preparation was undertaken using a laxative such as bisacodyl, 1 to 2 days prior to surgery. All surgery was performed under spinal anaesthesia and with prophylactic antibiotics.

All women had a 4th degree perineal tear or a cloacal deformity (Fig. 1). The woman was placed in lithotomy position. Infiltration of the tissues was undertaken using a vasoconstrictor as diathermy is often unavailable and mains/grid electricity unreliable. By way of landmarks for the edges of dissection and perineal body length, Allis forceps were placed over the torn edges of the vaginal introitus and the torn edges of anal verge, (Fig. 2). Care was taken when placing the Allis forceps as not to narrow the anus. Incisions were made over the fistula edge where the anorectal and vaginal mucosa/perineal skin have fused. The anorectum was mobilized off the vagina/perineal skin. Remnants of the torn external anal sphincter were identified and mobilized. The rectum (mucosa and muscularis) was closed in 2 layers with an absorbable suture (2.0 or 3.0 polyglactin). It was not possible to identify the internal anal sphincter as a separate structure. An overlapping external anal sphincter repair was performed using interrupted delayed absorbable suture (2.0 polydioxanone). The vaginal epithelium was closed from its apex in the vagina to the introitus with polyglactin suture. The perineal body was reconstructed using interrupted absorbable suture, and the

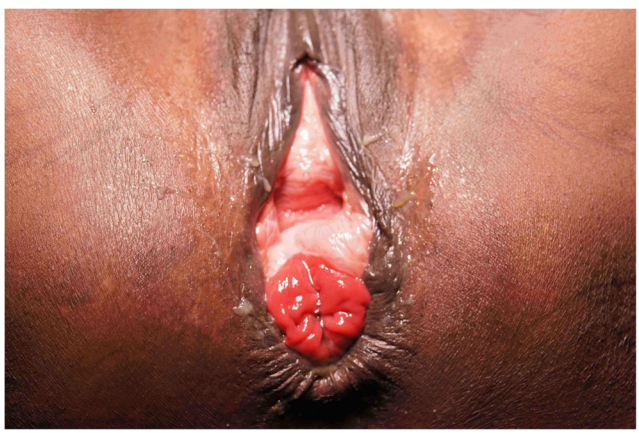

Fig. 1 Unrepaired 4th degree tear with a cloacal deformity

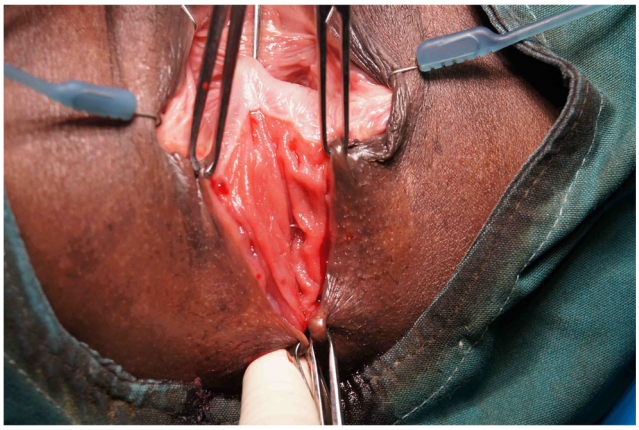

Fig. 2 Unrepaired 4th degree tear. Allis forceps placed over the edges of the vaginal introitus and 2 further Allis forceps approximating the torn edges of anal verge (bottom instrument). A finger in the anus to ensure adequate capacity. The position of these 4 Allis forceps indicates the length of perineum after repair and reconstruction

perineal skin was closed (Fig. 3). A vaginal pack and indwelling urethral catheter were inserted at the conclusion of the procedure and left in situ for 2 days.

Post-operatively, the women remained on fluid only diet for 2 days and then on a normal diet. If bowels had not opened by day 3 post-operatively, an oral laxative was prescribed. All women had daily perineal wash and inspection by the ward nurses. All patients had their bowels open prior to discharge. All women were examined prior to discharge. Discharge usually occurred between days 5 to 7 post-operatively. Some women remained longer until transportation was available.

Results

All eligible women agreed to participate in the study. A total of 68 consecutive women were recruited. In the December 2013 fistula camp, there were 23 women with unrepaired 4th degree tears and in the October 2015 fistula camp, there were 45 women with unrepaired tears. Hence, only the 23 women in the first camp were eligible for 12-months follow up at time of preparation of the manuscript.

Fig. 3 Completion of the repair with index finger in anus. The perineal body and anal sphincter has been reconstructed

The mean age at presentation was 33.7 years (range 18–80, median 30). The age given by the women may not be their true ages, as many do not know of their birthdate, and often estimate their age according to important events in their lives rather than a date.

The mean parity at presentation was 4.9 (range 1–10, median 5). The mean age at first delivery was 17.9 years (range 14–25) with 3 women unable to recall this information. On average the women had the 4th degree tear 10.1 years prior to presentation (range 2 months – 58 years, median 8 years). For the majority of women (54 %), the tear occurred at time of their first vaginal delivery. The remainder of women had the 4th degree tear at subsequent deliveries (range 2nd–9th delivery, mean 4.9).

Of the 68 women, 3 were widowed, and 32 (49 %) of the remaining 65 women reported that they faced social stigmatization and isolation by their husbands/families because of the unrepaired 4th degree tear. The most common complaint (41 %) by their husbands was that of faeces in the vagina and the vagina being 'too wide'. Forty-six women responded to questions on sexual function. Twenty-two were not sexually active of whom 3 were due to pain. Of the 24 women who were sexually active, 13 (54 %) complained of dyspareunia. The mean age of women who were sexually active was 39.7 years, of those not sexually active was 39 years and those with dyspareunia was 38.1 years.

Three women volunteered the information of sexual abuse by their husbands and 5 complained of violence at home and the women attributed this to the unrepaired tear. In other words, nearly 12 % of women volunteered that they were either physically or sexually abused by their husbands and believed that this was due to their unrepaired 4th degree tear.

Thirty-nine (57 %) women had not sought previous treatment for their perineal tear. Twenty-five women cited monetary constraint as their reason for not seeking treatment, another 11 were unaware that any treatment was available, 2 said it was too far to travel and 1 was afraid of hospitals. Of the 29 women who had sought treatment, 2 saw a traditional healer and were given herbs. The rest had been to a health centre but 17 were told no treatment was available, 1 was given medications and the remaining 9 had a procedure – they were uncertain what was done but it was not surgery in the vagina/perineal body.

In this study, all surgeries were performed under spinal anaesthesia, without the use of flaps or graft augmentation. All women had reconstruction of perineal body and complete closure of perineal skin at time of surgery. All women had daily perineal examination and wash by the ward nurses until discharge. All women had an examination by JG or HK after removal of the vaginal pack and prior to discharge. Of the 68

women, 1 had breakdown of the repair on Day 2 and this was re-sutured without any further problems.

As mentioned above, the Cleveland Clinic Continence Score and questionnaire were modified to suit the local environment because continence pads were not used as they were unavailable or too expensive (Table 1). As a result the maximum score in this study was 16 rather than 20. All women complained of incontinence to solid stools despite many indicating that they tried to keep the faeces firm/hard to reduce leakage of stool. At presentation, daily solid stool incontinence occurred in 59 % of women. Pre-operatively, the mean Continence score was 14.7 (range 10–16).

At 4 to 6 weeks post-repair, 61 of the 68 women were able to be contacted. All 61 women reported a Cleveland Clinic Score of 0. In other words, all women had perfect continence. The differences in the pre- and post-operative scores were statistically significant ($p < 0.001$, paired t-test). In the December 2013 camp, 23 women had an urepaired 4th degree tear. The remaining women had their repair in December 2015. At 12 months follow-up, only 9 women of the 23 eligible women were able to be contacted. Of these women, 8 had a score of 0 and only 1 woman was symptomatic with a score of 9 and her main problem was incontinence to flatus ("usually"). This woman had the wound breakdown on Day 2 requiring re-suturing.

Discussion

Significant perineal tear during vaginal delivery is not uncommon, affecting up to 9 % of vaginal deliveries [2, 3]. In the 3rd degree tear, there is injury to the perineum and anal sphincter complex, and in the 4th degree tear the injury extends to the anal epithelium. In the literature, the rates of significant tears (3rd and 4th degree) are often cited together. Some studies have demonstrated rates of 4th degree tears from 0.03 to 0.2 % of all vaginal deliveries and 4th degree tears account for 4.4–12.9 % of all significant perineal tears [4–7]. Therefore, in rural parts of low-income countries where the majority of the deliveries were undertaken by village birth attendants, these perineal tears are not repaired and heal by secondary intention. This results in fusion of the torn edges of the vagina and anorectum, together with complete separation of the divided anal sphincter.

In a previous cohort of 24 women with 4th degree tears in rural Uganda, it was shown that this condition created social stigmatization of the women with social abandonment [15]. In our current larger group, social abandonment was more significant with nearly 50 % of women being rejected by their husbands. The most common reasons for abandonment were faeces in the vagina and vaginal laxity. Although no direct questions were asked about safety at home, 8 women volunteered information regarding violence at home and they attributed this to the 4th degree tear. Because of their social status and often lack of family support and income, many of these women do not seek assistance and cannot afford transportation to the closest health care facility. Multiparous women are also at risk of 4th degree tears. In our series, 46 % were multiparous which is similar to that in the literature [9].

It was also noted that for those women who did try to seek help, many were told by the health facilities that no help was available. There is therefore a great need to inform and upskill local health practitioners regarding this condition and its management.

Most of the women presenting to the camps complain of significant anal incontinence. In the short-term, there is significant improvement in the Cleveland Clinic Continence Scores. Follow-up is often challenging in rural areas of low-income countries with poverty restricting follow-up at the hospital and fear for personal safety during the long journey back to the hospital. In addition, with the subordinate position of women, they require permission from their husband/family to travel. Contact was made via telephone but at 12 months following surgery, many of the telephone numbers were no longer connected. A survey form was not sent to the women as there are no formal addresses in rural villages and many women are illiterate.

The surgical technique described in this study is well suited in many conditions including areas of low resources. The lack of faecal diversion is of significant benefit in a low resource setting as there is no access to disposable stoma equipment and in many areas, it is also socially unacceptable. We agree with Vankatesh et al. [10] and Abcarian et al. [11] that diversion is not necessary in the management of obstetric injuries to the anorectum and there is no evidence that it improves outcome [9].

Various techniques have been described to reconstruct cloacal-type deformities including those from obstetric injuries.

Table 1 Modified Cleveland Clinic Continence Score

$N = 68$	Never	Rarely < 1x/month	Sometimes < 1x/week	Usually < 1x/day	Always everyday
Solid stool leakage			11	17	40
Liquid stool leakage			1	3	64
Gas leakage			1	8	59
Lifestyle restriction			4	14	50

These are usually small case series or those from breakdowns following primary repairs. This is the first large series describing the surgical management of the primary delayed closure of unrepaired 4th degree tear. Some have described leaving part (usually central) or all of the perineum open to allow drainage [9, 14]. We believe that this is not necessary in the closure of the unrepaired 4th degree tears. Other authors have described complex surgeries including the use of cutaneous flaps to reconstruct the defects [12, 13]. We agree with Hollingshead et al. [9] that a flap is not required because with the initial injury at time of delivery no tissue is lost. The obstetric injury caused tissues to tear, resulting in lateral displacement of structures. These structures require mobilization and repair without any flaps.

Our study is limited by short-term results. It also highlights challenges in performing studies and follow-up in rural low-income countries where there are no postal addresses in remote villages and return for follow up is difficult for a number of reasons including cost of transportation/infrastructure/roads, lack of regular transportation in remote areas, subordinate position of women (she cannot attend if her family/husband does not give permission) and in some areas, fear for personal safety. The only contact details we had for the women were mobile telephones (sometimes belonging to their neighbor). Even with this information, at 12 months and beyond, most women's telephones were either no longer connected or working. This may occur for a number of reasons including financial constraints to keep the telephone and no electricity to charge up the telephones. Many villages are not connected to grid electricity. As follow-up at 1 year was only in a limited number of women in our study, the results are to be interpreted with caution.

Although the Cleveland Clinic Score has been validated and used in many western countries, there is little data on its use in Uganda. However, it is a relatively simple questionnaire to use and the local nurses found it relevant and easy to use. The score was modified as continence pads are not used in many parts of remote low-income countries including western Uganda. The cost of the pads is prohibitive as the average income for a family is 1–2 dollars a day. The score was modified to a maximum of 16 instead of 20 with the removal of the question on pad use. Thus in this study, a score of 16 indicates the worst score and a score of 0 signifies perfect continence.

All women reported excellent improvement in continence scores in the short-term. Other studies [10, 14] have also demonstrated excellent outcomes with near perfect continence in the short term. Hollingshead et al. [9] demonstrated no significant deterioration of anorectal function in their series at a median follow-up of 5 years. Other studies of surgery for cloacal deformaties following failed primary repair of obstetric injury also demonstrated good longer term outcomes for anal continence and sexual function [11, 14].

Some have noted that although women with cloacal-type deformities have had a more significant anatomical defect, improvement in anal incontinence is often sustained, unlike those who have had acute obstetric injuries [9, 10] In a review of acute anal sphincter injuries, 60–80 % were asymptomatic at 12 months [16]. Although our findings of excellent short-term improvement in outcomes is similar to other studies, we are uncertain as to the reason for this compared to primary 4th degree tear repair. It may be that in the chronic/unrepaired cases, any pelvic neuropraxia from the vaginal delivery has had adequate time to fully recover and this would allow the pelvic floor to be functioning at it capacity.

In our series of 68 women, there were no significant complications and all the 4th degree tears were closed using the above described technique without any difficulty in adequate mobilization or repairing of the tear. Apart from 1 very early breakdown, we did not have breakdown of any other wound despite complete closure of the perineal skin during surgery.

Conclusion

There are many women hidden in many communities around the world with unrepaired 4th degree tears. Women report social abandonment and violence at home because of the tear. There is a need to educate and upskill health care professionals, especially in rural low income areas, in the management of significant perineal trauma. We describe the technique of delayed primary repair of 4th degree obstetric perineal tear under spinal anaesthesia, without faecal diversion and without surgical flaps. This technique, performed on 68 consecutive women had few complications and promising short-term results.

Compliance with ethical standards

Conflict of interest None.

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