

Comparison between urethrostomy and penile resection for treatment of congenital penile urethral dilatation in calves

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A clinical study was conducted under field condition during the period from January 2005 to December 2008 in Beni-Suef province on a total number of 15 calves suffered from congenital penile urethral dilatation at the perineal region. The affection was diagnosed and treated surgically under field condition and treatment included perineal urethrostomy (8 calves) and partial resection of penis including the dilated urethra (7 calves). Results revealed that duration of surgery for urethrostomy was shorter (mean 36.25 minutes) than penile resection (mean 85.71 minutes), bleeding was so extensive in penile resection group than urethrostomy one and cost of surgery was lower for urethrostomy than penile resection but aftercare cost was twice that of penile resection. Complications were higher in urethrostomy group, recovery period was nearly the same in both groups (14.37 and 14.28 days), mean body gain was higher in penile resection group (82 kg) than urethrostomy group (77.14 kg), and both groups considered of low quality animals at market as a result of loss of breeding capability and presence of urine scald. It could be concluded that both techniques are satisfactory but partial penile resection including the dilated urethra is superior to urethrostomy despite the higher cost and invasive surgical procedure.

Congenital urethral dilatation in calves is an uncommon affection that infrequently discussed in scientific veterinary literatures and texts. The condition occurs sporadically and is recognized easily, but sometimes it is neither so easily repaired, nor the outcome of its surgical correction has been fully discussed (Johnson, 1980; Karras *et al.*, 1992; Geccelep and Alkan, 2000; King *et al.*, 2002; Misk, 2008).

Dilatation is defined as the extension of cavitory organs in every direction and it is either congenital or acquired. Urethral dilatation is observed at the proximal perineum spot in heifers and adults, and emerges as a result of the transient urethral obstruction, or much less frequently due to bacterial urethritis of the lower urinary section (Tharp and Venzke, 1954; Karras *et al.*, 1992; Anderson *et al.*, 1993; Gasthuys *et al.*, 1993).

The condition can be observed few days after birth or even up to many months later (Anderson *et al.*, 1993; GeCcelep and Alkan, 2000; King *et al.*, 2002). Clinical signs included presence of large bladder-like mass protruding from the perineal midline with difficult

urination. Differential diagnoses include cutaneous cyst, ectopic urinary bladder, urethral diverticulum (dilatation), and rupture of the urethra at the level of ischial arch (Anderson *et al.*, 1993; King *et al.*, 2002).

The condition is usually associated with urethritis and/or cystitis as a result of accumulation of urine in the swelling for a long period (Anderson *et al.*, 1993; Parsons *et al.*, 1998), and even rupture of the urinary bladder may ensue if the condition was associated with aplasia of the penis (Javdani *et al.*, 2009).

Treatment of such cases was directed towards surgical correction when it is possible (Karras *et al.*, 1992), otherwise perineal urethrostomy or penile resection is indicated if infection is refractory to conservative management. However, success rate of surgical treatment by urethrostomy varied from 37.5 % in eight cases to 100 % in one case (Gasthuys *et al.*, 1996; GeCcelep and Alkan, 2000). Moreover the over all success rate of urethrostomy, either short term or long term, was not satisfactory in many literatures (Haven *et al.*, 1993; Van Metre *et al.*, 1996) as it may be followed with stricture of the fistula orifice or cystitis (Stone *et al.*, 1997).

The aim of the present work is to evaluate two surgical techniques (the traditional perineal urethrostomy and partial penile resection including the dilated urethra) for treatment of

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congenital penile urethral dilatation in calves and their long-term survival, cost and outcome.

Materials and Methods

The study was conducted during the period from January 2005 to December 2008 in Beni-Suef province on a total number of 15 calves suffered from congenital penile urethral dilatation at the perineal region.

Animals. The subjects of the study were 15 calves, 6-12 months and 60-120 kg live body weight and these animals were treated under field condition. Clinical examination of these animals was performed according to Kelley (1984).

History and clinical signs. These animals were purchased from markets with perineal swelling and had episodes of fluctuating fever that partially respond to antimicrobial treatment. Affected animals had circumscribed fluctuating swelling that appeared in mid-perineal region ventral to the anus and extended over the perineal region till the scrotum. The size of the swelling varied from 10-20 cm in diameter with no pain reaction at palpation and squeezing revealed exudation of whitish yellow fluid from the prepuce orifice. Stimulation of urination caused enlargement and tendering of the swelling that was followed by continuous passive dripping of turbid whitish yellow urine. Aseptic exploratory puncture of the swelling revealed presence of fluid of the same mentioned physical characters and ammoniacal odor.

Surgical treatment. Affected animals were classified into two groups, group (I) consisted of 8 animals was subjected to urethrostomy (Figs. 1-5) and group (II) consisted of 7 animals was subjected to partial penile resection including the dilated urethra with establishment of urethral fistula below the anus (Figs. 6-10).

Group I. These 8 calves were subjected to urethrostomy in the following manner. Animals were subjected to caudal epidural analgesia by using lidocaine HCl 2% and sedation by intramuscular xylazine HCl 2% in a dose rate of 0.22 mg/kg (Hall and Clarke, 1981). The animals were positioned and restrained in lateral recumbency and the seat of surgery was prepared for aseptic surgery in routine manner, then after an elliptical incision 5-7 cm length and 3 cm width was created at the lowest point of the swelling just dorsal to the scrotum (Fig.1-5). The incision was advanced to open the swelling after which the contents of the swelling were evacuated and the cavity was flushed with mild antiseptic solution (povidone iodine 10% diluted

50% with saline). The wall of the urethra was sutured to the skin with simple interrupted silk stitches in order to create urethral fistula.

Aftercare included daily flushing of the swelling with the mild antiseptic, dressing of the wound, and systemic long acting tetracycline 20% 1 ml/10kg.

Group II. The affected (7) calves were anesthetized, restrained, and prepared for aseptic surgery in the same manner as group (I). Animals were injected intravenously with 250 mg ethamsylate (Haemostop®, Amoun Pharmaceutical Co., El-Obour City, Cairo, Egypt) 20 minutes prior to surgery for control of bleeding.

An elliptical skin incision connecting the two poles of the swelling was created. The incision was extended from the anal pole to the scrotal one, after which blunt dissection was advanced to separate the swelling from the surrounding skin and thin muscular layer without opening it. The ventral pole was separated first and the stump of the penis connected to the swelling was grasped with two haemostatic forceps and ligation was applied in between. Dissection was completed and advanced towards the anal pole. The dead space below the swelling was sutured by catgut and skin was closed by silk number 1-2 in interrupted manner started at the scrotal pole towards the anal one. The upper 5 cm of the skin wound was left opened and the swelling was excised to make a cone that was sutured to the skin in order to create wide urethral opening similar to urethrostomy (Fig.6-10). Aftercare was made in the same manner as group (I).

Each animal was monitored for 6 months and data were collected including duration of surgery, severity of bleeding, cost of surgery, cost of aftercare, complications, recovery period, body gain, durability, and penalizing of animal for low price as a result of surgery.

Examination of urine of affected animals was performed according to Benjamin (1984) and Kelley (1984).

Results

During surgery, the inner mucosal surface of the dilated urethra showed necrosis with presence of large amount of pus mixed with ammoniacal odor fluid. Moreover a pseudo-diphtheritic necrotic tissue adhered to the mucosa was observed (Fig.4). Surgical procedure was easier in urethrostomy group than the group subjected to partial penile resection including the dilated urethra, as the bleeding was

more controllable and violence of dissection could be avoided.

Regarding duration of surgery, it was observed that the duration of urethrostomy is shorter than that of partial penile resection, as urethrostomy lasted 20-55 minutes with a mean of 36.25 minutes controversial to partial penile resection that lasted 60-110 minutes with a mean of 85.71 minutes (Table 1). Moreover the bleeding was so extensive in partial penile resection technique when compared to the urethrostomy one.

With respect to the cost of surgery and aftercare, it was found that the cost of urethrostomy is 75% that of partial penile resection, but the cost of its aftercare was twice that of partial penile resection (Table 1).

Regarding complications, urine scald was observed in both groups but the incidence of other complications like cystitis and abscess formation was higher in urethrostomy group (3 calves) when compared to partial penile resection group (one calf) as shown in Table 1.

Results showed that recovery period was nearly the same in urethrostomy and partial penile resection groups (14.37 and 14.28 days respectively) (Table 1).

Monitoring of the weights of operated animals 6 months post surgery revealed that the mean body gain was 82 kg in partial penile resection group and 77.14 kg in urethrostomy group. However three animals were sold and evaluation of their body gains and weights was not available 6 months after surgery.

The created urethral opening was satisfactory in partial penile resection group than urethrostomy group as two animals of group (I) required widening of the urethrostomy fistula 4 months post surgery as a result of stricture of the fistula orifice (Table 1).

With respect to penalizing the animal at markets for low price at sale, both groups penalized and considered as low quality animals as a result of presence of both urine scald and urethral fistula as these animals became unfit for breeding (Table 1).

Table (1): Number of operated animals and duration of surgery, severity of hemorrhage, cost of surgery and aftercare, complications, weight before and 6 months after surgery, durability, and sale blemishing.

	Animal number	Duration of surgery	Severity of bleeding	Cost of surgery in unite	Cost of aftercare in unite	Complications	Recovery period in day	Weight before surgery	Weight after 6 months	Body gain in Kg	Durability	Sale blemishing
Urethrostomy	1	20	-	150	100	C	15	60	115	55	> 6 m	+
	2	25	-	150	0	-	10	60	145	85	> 6 m	+
	3	35	-	150	0	-	10	80			*	
	4	50	-	150	0	-	10	120	210	90	> 6 m	+
	5	45	-	150	100	C	25	100	180	80	4 m	+
	6	35	-	150	40	A	25	80	160	80	4 m	+
	7	55	-	150	0	-	10	120	200	80	> 6 m	+
	8	25	-	150	0	-	10	60	130	70	> 6 m	+
	Mean	36.25	-	150	30	3	14.37	97.14	162.8	77.14		
Partial penile resection	A	70	+	200	0	-	15	60	135	75	> 6 m	+
	B	80	+	200	0	-	15	60	140	80	> 6 m	+
	C	90	+	200	0	-	15	60	145	85	> 6 m	+
	D	110	+	200	100	C	20	120	0		*	
	E	100	+	200	0	-	15	120	220	100	> 6 m	+
	F	90	+	200	0	-	10	120	0		*	
	G	60	+	200	0	-	10	80	150	70	> 6 m	+
		Mean	85.71	+	200	14.28	1	14.28	88.57	158	82	

A= Abscess, C= Cystitis, m= Month, and * means that the animal did not complete the study.

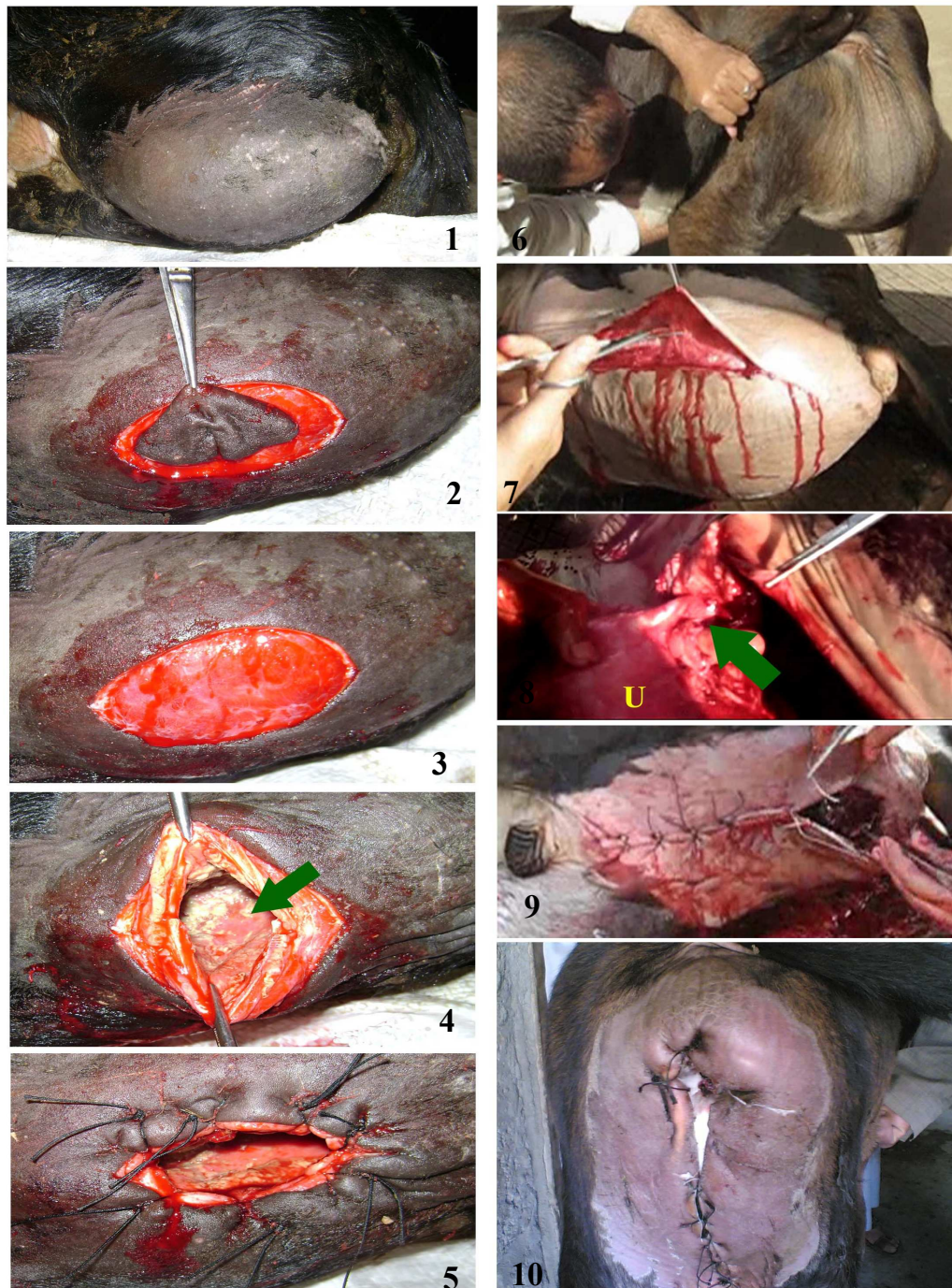


Figure (1): A calf with congenital urethral dilatation (group I, 3) prior to urethrostomy

Figure (2): The same calf after elliptical incision of the skin

Figure (3): The same calf after elliptical excision of the skin

Figure (4): The same calf after elliptical excision of the thin superficial muscular layer and urethra, arrow denotes necrosis and infection of urethral wall

Figure (5): Final shape of animal after urethrostomy

Figure (6): A calf with congenital urethral dilatation (group II, D) prior to surgical excision

Figure (7): Elliptical incision of skin and blunt dissection of the thin superficial muscle over the urethra

Figure (8): Complete dissection of the swelling and exposure of the penis ventral to it for ligation, arrow denotes the penis and U means dilated urethra

Figure (9): the animal after suturing of the skin and fixation of the cone of dilated urethra ventral to anus

Figure (10): the same animal after 7 days.

Discussion

One of the most important aims of veterinary surgery in our locality is to save animal protein for our population, and at the same time it should be on economic base. From this point of view, certain Egyptian literatures discussed feasibility of treatment of certain surgical affections in our localities and the outcome of treatment of such affections (Abdel Fattah and Saleh, 2005). However the current study was conducted on a rare affection that infrequently reported in literatures and in general, treatment of such cases is directed towards correction of such affection when it is possible (Karras *et al.*, 1992; Gasthuys *et al.*, 1996; GeCcelep and Alkan, 2000).

Comparison between the two techniques revealed longer duration of surgery in group (II) than group (I) that can be explained in the light of severe adhesion between the dilatation and surrounding tissue as a result of prolonged duration of affection in addition to severe bleeding that required longer time for control, despite pre-surgical injection of hemostatic drug. Regarding the cost of surgery it was lower in urethrostomy technique than partial penile resection one, but the economical net revenue of surgical interference in both groups was high (Abdel Fattah and Saleh, 2005). Despite of the higher cost of aftercare in group (I) than group (II), the actual cost of aftercare was zero in both groups, but the represented cost involved treatment of complications that was the main reason of high cost of aftercare in both groups.

The observed complications in both groups agree with that mentioned by Anderson *et al.*, (1993); Van Metre *et al.*, (1996); Stone *et al.*, (1997); Parsons *et al.*, (1998); Susan (2003). However the incidence of cystitis was higher in urethrostomy group than partial penile resection one and it might be related to pooling of urine caudoventral to the ventral commisure of urethrostomy opening. However, the observed cases of cystitis required prolonged duration of treatment with massive dose of antibiotic, diuretic, and anti-inflammatory that increased the overall cost of aftercare and recovery period and at the same time affected animals had lower body gain even after 6 months. Aside from complications, both groups had the same aftercare cost and duration of recovery was 5 days shorter in urethrostomy group. Stenosis of urethrostomy opening is a common complication of urethrostomy that may require reopening many times for establishment of a stoma despite it may be patent for 1-8 years in some studies

(Susan, 2003) but generally it has limited success rate (Haven *et al.*, 1993; Van Metre *et al.*, 1996). Stenosis was recorded in two calves in group (I) and it might be due to many factors as invasive approach into the urethra that is associated, unfortunately, with an increased risk of stricture formation, urethral scarring, and predisposition for re-obstruction (Harari, 2003); abscess formation in one calf and its invasive treatment; pooling of urine caudoventral to the ventral commisure of urethrostomy with continuous irritation of the skin around the stoma and formation of over granulating tissue; and finally the direct contact of the two lips of the wound via pressure of the medial aspect of the two thighs. On the contrary, partial penile resection technique did not associated with stenosis despite surgical procedure in this group was more invasive and this can be explained in the light of the higher position of the created stoma (directly under anus) that prevented direct contact of wound lips, accumulation of urine at ventral commisure, and subsequent abscess formation. Accordingly the stenosis might be related to the position of stoma rather than being related to the invasiveness of the surgical procedure. However, the observed high success rates with both techniques agrees with that given by Susan (2003) and disagree with that of Haven, *et al.*, (1993); Gasthuys *et al.*, (1996); Van Metre *et al.*, (1996).

Clinical signs of cystitis included painful frequent urination with voiding of small amount of urine each time. Rectal examination revealed that the bladder wall was thick and painful to some extent (Radostits *et al.*, 2000). Urine of affected animals was turbid and had strong ammoniacal odor. Moreover, microscopic examination of urine sediment revealed presence of erythrocytes and leucocytes (Benjamin, 1984; Kelley, 1984; Radostits *et al.*, 2000).

Animals of both groups were penalized for low price at markets as a result of urine scald, loss of breeding capability and this agrees with Van Metre, *et al.*, (1996) and Susan (2003), however the results were satisfactory to owners as the appetite of animals improved after surgery, fluctuation of temperature disappeared and body gain was accepted although it was lower than normal animals of the same age. Moreover, it is expected that fattening of these animals to slaughtering weights adopted in our markets would increase the economical net revenue of these animals and this agrees with that mentioned by Abdel Fattah and Saleh

(2005). Although both techniques were satisfactory, and despite partial penile resection technique was associated with higher surgical cost, more severe bleeding, and invasive surgical procedure, it can be considered superior to urethrostomy for treatment of congenital urethral dilatation as a result of lower incidence of complications, lower aftercare cost, and better body gain.

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مقارنة بين الاستحداث الجراحى لناصر مجرى البول و الاقتلاع الجراحى لعلاج التمدد الورائى لمجرى البول فى منطقة العجان فى العجول

تم إجراء هذه الدراسة فى الفترة من يناير 2005 و حتى ديسمبر 2008 تحت الظروف الحقلية فى محافظة بنى سويف على عدد 15 عجل مصاب بتمدد ورائى لمجرى البول فى منطقة العجان. تم تقسيم الحيوانات إلى مجموعتين حيث اشتملت المجموعة الأولى على 8 عجول عولجت بالاستحداث الجراحى لناصر مجرى البول أما الثانية فكانت 7 حيوانات تم علاجها بالاقتلاع الجراحى لمجرى البول وتحويل فتحت القضيب أسفل فتحة الشرج. أظهرت النتائج أن فترة التدخل الجراحى وكمية النزيف وتكلفة الجراحة فى المجموعة الأولى اقل من الثانية أما تكلفة المتابعة بعد الجراحة فكانت اقل فى المجموعة الثانية نظرا لانخفاض نسبة المضاعفات. كما تبين أن متوسط فترة النقاهة كان متساويا فى المجموعتين إلا أن 25% من حيوانات المجموعة الأولى احتاجت إلى توسيع للناصر بعد 4 أشهر من الجراحة بالإضافة إلى أن معامل التحويل كان أعلى فى المجموعة الثانية. كما كان من الواضح أن سعر الحيوان التقريبي فى الأسواق كان منخفضا فى كلا التقنيتين لعدم قدرتها على التناسل ووجود سلوق بين الفخذين وعدم وصولها لأوزان الذبح المتعارف عليها و أن هذه الحيوانات يمكن أن تعود بمنفعة مادية إذا تم تسمينها وبيعها فى أسواق اللحوم. وفى النهاية ورغم أن كلا التقنيتين كان مناسباً لعلاج هذه الحيوانات إلا أنه يوصى باستخدام الاقتلاع الجراحى كبديل لاستحداث الناصور لعلاج العجول المصابة بتمدد ورائى لمجرى البول.