

# Meatal Stenosis Post Traditional Neonatal Circumcision-Cross Sectional Study

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## ABSTRACT

**Context:** Circumcision holds a unique place in daily practice of urology. Heat cautery device is most common local technique used we found it can cause meatal stenosis and its sequels.

**Aim:** To determine the incidence, presenting symptoms of meatal stenosis and its relation to local traditional neonatal circumcision techniques among our children.

**Settings and Design:** This retrospectively study.

**Methods and Materials:** Total 150 child who circumcised during infancy period, outside medical institutes and they circumcised using local traditional techniques either heating cautery device or surgical knives. Statistical analysis of data was carried out using the Statistical Packages for Social Sciences- version 25 (IBM Corporation).

**Results:** Of 150 child, 60 (40%) had meatal stenosis. The mean age at time of diagnosis was  $5.98 \pm 3.06$  years (Range 1-13 years) and the majority of patients was within age group of 5-9 years (n.31, 51.7%), median 6.0 years. The incidence of MS was significantly higher ( $P=0.037$ ) among group of child circumcised with heating device in comparison with circumcised group with other method. Forty-six child (76.7%) were symptomatic and fourteen child (23.3%) diagnosis of MS had made incidentally.

**Conclusions:** Meatal stenosis is a long-term complication of neonatal circumcision with a late presentation and sequels. It is more commonly among group circumcised using heating cautery. We recommend using heating cautery cautiously.

**Keywords:** Meatal stenosis; Neonatal circumcision; Traditional techniques of circumcision

## INTRODUCTION

Newborn circumcision holds a unique place in daily practice of urology. Circumcision is primarily performed by non-urologists. It is traditionally undertaken as a mark of religious importance or for perceived health benefits such as improved penile hygiene or reduced risk of infection [1,2].

Circumcision, like other surgical procedures, has intraoperative and postoperative complications with rate varying from 1 to 15% [3,4].

The published literature has been shown that the daily practice of newborn circumcision in our culture as following, traditional circumciser or nurse performed the majority (70%) of circumcisions and 81% were done outside hospitals.

Concerning the circumcision techniques used in our study include only bone cutting (guillotine style) with using heat cautery or surgical knives to cut the prepuce while, other methods like (Mogen clamp) or device (Plastic rings) have not been used in our practice [5].

Heat cautery device is most common local technique used for non-therapeutic neonatal circumcision in our culture as it is a simple, low cost, easy to learn and perform and can be used to cutting prepuce and as hemostatic tool.

Heat cautery device is traditionally named Kawai, which is a modified instrument locally manufactured with a sharp metallic filament at its end converting electric energy to heat the filament so that it is used as a cutting diathermy (Figure 1) [5].

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Received date: March 17, 2020; Accepted date: July 20, 2020; Published date: July 27, 2020

Citation: Abid A (2020) Meatal stenosis post traditional neonatal circumcision-cross sectional study. Med Sur Urol 9:234. doi: 10.24105/2168-9857.9.234

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**Figure 1:** Heat cautery device.

Meatal stenosis (MS) is a one of late and potential complications of male circumcision that occurs in 5-20% of boys circumcised during infancy or childhood [6,7].

Meatal stenosis is a narrowing of external urethral meatus which anatomically defined as a meatus diameter less than 5Fr and visually defined as distortion of meatus shape and location from oval shape, extends from apex of glans downward to frenulum to narrow pin point shape, situated at apex of glans penis, which are currently accepted diagnostic tools Figure 2 [8,9].



**Figure 2:** Meatal stenosis.

The cardinal symptoms of MS are narrow high velocity stream, penile pain at initiation of micturition, which can be masked in diaper, and boys often presented after toilet training. However MS can be asymptomatic.

Urinary tract infection, hematuria, incontinence, nocturnal enuresis, abdominal pain during and shortly after voiding, discharge of pus, vesicoureteral reflux, hydronephrosis and renal impairment, all are reported presentations of MS [10,11].

Up to our best knowledge, this is the first published study focusing on meatal stenosis as a remote complication among our children following ritual neonatal circumcision, sharing our observations with others regarding prevalence, clinical presentations of MS and its relation to traditional techniques of circumcision used in our culture.

## MATERIALS AND METHODS

After obtaining approval from the local ethical committee of our hospital, a retrospective study was conducted over a period of two years from June 2015 to June 2017, on children visited at the outpatient clinic of pediatric surgery for urology problems or other complaints (hydrocele, inguinal hernia, gastro-intestinal disease, etc.) accompanied by their parents.

Of 213 consecutive children, 150 (70.4%) had been circumcised during infancy. Outside medical institutions using local traditional techniques and met our exclusion criteria (history of urethral surgery or instrumentation, congenital anomalies of the urogenital tract, circumcision cases done for

medical reasons, circumcision done three months before examination, parents not remembering method and place of circumcision and history or diagnosed cases of dysfunctional elimination syndrome) were recruited in the study.

Eighty-two percent (n: 123) of children were circumcised using a bone cutter and heat cautery device, and 18% (n: 27) of circumcisions were performed by using a bone cutter and surgical knives to cut the prepuce.

Eighty-eight (58.7%) of children were circumcised by a non-physician, and 62 children (41.3%) were circumcised by a physician.

The children were examined carefully, focusing on the genital region, done by the treating physician, and the criteria for diagnosis of MS were based on visual inspection of the pinpoint-shaped meatus and inability to pass a 5-Fr feeding tube into the urethral meatus.

The demographic data of children and their symptoms and signs (dysuria, frequency, enuresis, straining on voiding and narrow high velocity stream) were documented. Renal function tests, urinalysis, urine culture, voiding cystourethrogram, and ultrasonography were requested.

## STATISTICAL ANALYSIS

Analysis of data was carried out using the Statistical Packages for Social Sciences - version 25 (IBM Corporation). The significance of differences of different percentages were tested using Pearson Chi-square test (2-test) with application of Yates's correction or Fisher's Exact test whenever applicable.

## RESULTS

In our study group, the overall incidence of meatal stenosis was 40% (n: 60/150). The mean age of patients at time of diagnosis was  $5.98 \pm 3.06$  years (Range 1-13 years) and the majority of patients were within the age group of 5-9 years: n: 31 (51.7%) median 6.0 years.

The incidence of MS was significantly higher ( $P=0.037$ ) among the group of patients circumcised with heat cautery: n: 54 (43.9%) in comparison with the group circumcised with other methods: n: 6 (22.2%).

The use of bone cutting and heat cautery was higher in the non-physician group: n: 79 (64.2%) in comparison with the physician group where they used heat cautery: n: 44 (35.8%) of their practice, however there is no difference in the incidence of meatal stenosis between physician and non-physician groups.

Forty-six children (76.7%) were symptomatic, and 14 children (23.3%) are not reported symptoms. Diagnosis of MS had been made incidentally during physical examination for unrelated pathology. The symptoms and ultrasound findings are outlined in Table 1.

Blood urea and serum creatinine were elevated in two patients and within normal range for the rest of the subjects.

Dipstick urinalysis showed microscopic haematuria in 5 (8.3%) patients, pyuria in 9 (15%) and bacteriuria in 4 (6.6%) patients, where their urine culture revealed growth of *E. coli*.

Voiding cystourethrogram (VCUG) was performed in 4 patients (4/6) in whom ultrasound showed bilateral hydronephrosis and

bladder wall thickening but no vesicoureteral reflux, 2 patients their families were refused to do VCUG.

**Table 1:** Meatal Stenosis findings among studied group.

Clinical presentation	Number (%)
Asymptomatic	14 (23.3%)
Symptomatic	46 (76.7%)
narrow and upward urinary stream	16 (26.6%)
Dysuria+or discomfort on voiding	11 (18.3%)
Frequency	9 (15%)
Enuresis	4 (6.6%)
Combination of symptoms	4 (6.6%)
Obstructive uropathy	2 (3.3%)
Elevated Renal function indices	2 (3.3%)
Ultrasound findings	18 (30%)
Bladder wall thickening $\geq 3$ mm	10 (16.6%)
Bilateral mild hydronephrosis & bladder wall thickness	6 (10%)
obstructive uropathy (bilateral Hydroureteronephrosis & distended bladder)	2 (3.3%)

Meatoplasty were done for all children and 53 (46 symptomatic and 7 asymptomatic). Parents' consent had taken as we believed that MS can be associated with late complications (bladder wall thickness, obstructive uropathy, recurrent UTI, etc).

Meatoplasty done under general anesthesia was performed as day case surgery and children were followed up for 12 months. Post-operative visits were done at 1,3,6 and 12 months. Both parents and children satisfied with urine flow, symptoms relief and no recurrent cases of MS documented.

## DISCUSSION

Meatal stenosis can be seen either congenitally as component of Townes Brocks syndrome, kindler syndrome, hypospadias and isolated; or can be acquired after hypospadias repair, circumcision, penile trauma, Prolonged urethral catheterization, balanitis xerotica obliterans (BXO) [10].

The published literatures showed a wide range in incidence of MS following neonatal circumcision, which can range from 0.9% to 23% and may be higher in areas where circumcision performed outside health institutes by unqualified persons using local techniques for circumcision [3,11,12]. A recent population-based epidemiological study from Denmark 1977-2013 has been provide evidence that risk of MS is increased at least six-fold after non-therapeutic circumcision with 95% confidence interval particularly in boys less than 10 year-old [7].

In contrary a Meta-analysis study published by Morris et al. containing data on MS following circumcision at any age and long-term follow up window was not considered in his systemic review, concluded that risk of MS less than 1% after circumcision was low [13].

Meatal stenosis following neonatal circumcision has not addressed well in our clinical practice. As parents not get attention to urination of their children and most of time physician treated symptoms of MS (UTI, enuresis and dysuria) and not focusing on shape of meatal orifice and caliber of urine flow.

In our study, the incidence of meatal stenosis was 40 % (no.60) and significantly higher among the group circumcised using heating cautery device ( $P=0.037$ ), as it can cause an uncontrolled vascular and tissue damages resulting in various degree of burns, edema, ischemic damage to penile tissue and lately meatal stenosis and scar formation around glans penis.

In contrary Makhoulf et al. studied (n.518 boys) was stated safety of using heating cautery for circumcision, the drawbacks of their study was mean age for circumcision was  $3.31 \pm 2.33$  years and no long term follow up [14].

The relationship of heat cautery and MS has explained by the effect of heating on tissue, heat cautery increases the potential for more tissue reaction and results in electrical injury to frenular artery that may predispose to MS.

The chemical and mechanical traumas may be not responsible for MS post neonatal circumcision as it is absent in boys with hooded prepuce [15,16].

The mean age for diagnosis of MS in our study group is  $5.98 \pm 3.06$  years (Range 1-13 yr) in coincidence with other authors reported that prevalent age for diagnosis of MS following neonatal circumcision were 3-months -13 years and 1-2 years. Favoring the conclusion that MS can be a late complication of neonatal circumcision [17,18].

Meatal stenosis has varied presenting symptoms in published literatures, 23.4% (n.14/60) of our studied group diagnosis of meatal stenosis was done incidentally in agreement with Joudi et.al. As they reported asymptomatic meatal stenosis following neonatal circumcision in more than fifth of their patients (n. 27/132), high lights the importance of long-term follow up genital examination in all children who had circumcised during neonatal period [9].

Narrow -upward deflection of urinary stream and dysuria are most common presenting symptoms in our patients in agreement with others [10,17].

Two patients had febrile UTI with obstructive- uropathy (bilateral Hydroureteronephrosis and distended bladder) as their meatal stenosis were missed at initial visit. Therefore, we need to stress on meatal examination.

Parents and authors preferred to utilize general anesthesia to perform formal meatoplasty, in concordance with Godley et al as they reported that formal meatoplasty under general anesthesia was associated with a lower re operation rate (0.2%) [18].

In our study, ultrasound findings (Hydronephrosis, bladder wall thickening) were found in 18 (30%) patients. Ultrasound revealed resolving the hydronephrosis and hydroureter in 5/7 patients. While, bladder wall thickening doesn't resolve in short term, this attributed to the late presentation of MS (1-13 year) post neonatal circumcision and long time before parents seeking medical care both factors can lead to prolonged time till resolution of urinary tract changes.

On follow up visits, the elevated renal indices and urinalysis normalized within one month after operation.

Patient history, physical examination, and witnessed voiding all can be used as determiner of treatment success. Uroflowmetry might add objective parameters for the assessment; however, it is unnecessary since it does not change the management [19].

Limitations in this study were the retrospective design of the study and a small number of control group was including.

## CONCLUSION

In conclusions, meatal stenosis is a late complication of non-therapeutic neonatal Circumcision. A narrow- upward urine deflection is a common symptom of MS. obstructive uropathy was an occasional manifestation of MS. It is significantly higher among children circumcised using heating cautery. We advise to use heat cautery cautiously and to inform parents about long-term association between heat cautery device and MS.

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