

ORIGINAL ARTICLE

Proper Technique Prevents Poor Performance And Fate: A Comparison of Circumcision by Plastibell Method in Neonates and Infants

Muhammad Danish Muneeb¹, Mirza Agha Naushad Baig²

1. Department of Surgery, Baqai University Hospital, Karachi, Pakistan.

2. Zubaida Medical Centre, Karachi, Pakistan.

Correspondence to: Dr. Muhammad Danish Muneeb, **Email:** danishmuneeb@yahoo.com.

ABSTRACT

Objective: To evaluate the effectiveness of circumcision performed by Plastibell method by virtue of its complications among neonates and infants.

Methods: A prospective study was conducted at Baqai University Hospital Karachi during the period of January 2016 to January 2018. Plastibell circumcision was performed in 300 neonates and infants. A standard proforma was employed regarding patient's age, size of the ring, time taken for the device to fall-off, and complications. All neonates and infants were called on 2nd day and were advised to inform the day of the ring to slough off.

Results: Of 300 cases, 274 (91.3%) patients were complication free. Amongst these, 140/150 (93.3%) were neonates and 134/150 (89.3%) were infants. The overall complications were in 26 (8.7%) cases which included delayed separation of Plastibell ring in 11 (42.3%), proximal ring migration in 7 (26.9%) cases, bleeding in 5 (19.2%), and localized superficial infection in 3 (11.5%) cases. A significant difference of ring slough off time was observed between neonates and infants (p value < 0.001). However, the complications developed were not affected either by ring size (p-value 0.135) or ring slough off time (p-value 0.977).

Conclusion: The difference of rate of complications between neonates and infants is minimal. Therefore, the age difference of neonates and infants does not pardon the effectiveness of Plastibell technique and renders it safe and similar in its outcome. Hence, a proper Plastibell circumcision technique provides satisfactory results even in a year-old child and rectifies the hesitancy amongst the surgeons.

Keywords: Circumcision, plastibell method, neonates, infants.

INTRODUCTION

Circumcision is one of the most performed surgical procedures throughout the world.¹ The procedure invention dates back 15000 years back.² Males who are circumscribed are estimated as one third of the world population.³ The circumcision through Plastibell method was introduced in 1956 among the clinicians.⁴ Religion is the most common reason to undergo circumcision followed by culture, social and medical issues.⁵ The World Health Organization (WHO)'s manual has declared Plastibell technique as a well-defined method in relation to

its complications and outcome.⁶ Other than plastibell method, open technique, bone cutter method, and use of clamps, lists the different options for circumcision.^{7,8}

In previous studies, complication related to Plastibell technique ranges from 2–11%.^{7,9} Plastibell method circumcision has a mark of safety for children of 2 years of age and below in experienced hands.¹⁰ That's why plastic devices, although more commonly used at age of 1 year and below, can also be used for children above a year of age due to its simplicity.^{2,4}

Complications related to Plastibell circumcision may include bell impaction, bleeding, infection,

extra skin cutting, delayed separation of the plastic device and proximal ring migration¹¹, which are found to develop in age groups less than a year. In order to rectify the bias of complications which develop even in a child of less than one year of age using Plastibell and to conclude the effectiveness of Plastibell technique, we share our experience demonstrating the relationship of this technique with the complications in neonates and infants.

METHODS

This prospective study was conducted at Baqai University Hospital Karachi during January 2016 to January 2018. Two groups were defined as neonates (birth to 4 weeks) and infants (5 to 52 weeks) which were enrolled from outpatient clinics. Preoperative examination was done in every patient. Patients having low birth weight, history of bleeding disorders or immunocompromised status, hypospadias, deep jaundice, and having any sort of systemic illness were excluded from the study. All parents of the subjects were counselled, and informed consent was signed. A standard proforma was employed regarding patient's age, size of the ring, time taken for the device to fall-off, and complications as approved by the hospital's ethical committee. Plastibell is a transparent ring, with different circumferences, and a groove, around which a thread is tied. During the procedure, one technician assists the surgeon and the other hold the baby in the required position. Aseptic measures were taken. Foreskin was retracted from the glans and adhesions between foreskin and glans were broken gently with the help of wet gauze. Firstly, a curved artery was used to hold the skin ventrally at 6 o'clock position, visualizing the urethral meatus and this position of artery forcep also marked a point, helping the dorsal placement of straight artery at 12 o'clock position, which crushed the dorsal skin. Afterwards, a slit was made dorsally over the crushed line with the help of scissors, taking care not to go beyond the lower edge of glans. An appropriate size of Plastibell which snugly takes its position on two thirds of the glans was placed. A cotton thread is tightened properly around the groove, palpating it, by the primary surgeon. One

circle of thread was made giving it a double reef knot ventrally and appropriate force made to tighten this thread. A second single knot then made dorsally (Figure 1). The spandle of the plastibell was snapped and the foreskin cut. Hemostasis at that time was also secured and reassured after 5 minutes.

Parents were instructed for the care of knotted ring and were counselled to contact on mobile phones as appropriate. All neonates and infants were called on 2nd day and were advised to inform the day of the ring to slough off. The patients whose ring was not separated even after a couple of weeks, their ring was cut with the help of ring cutter.

The statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) version 16.0. Descriptive measures; like percentage and frequency were reported to describe categorical variables. Median and interquartile range (IQR) were reported to describe continuous variables. Mann-Whitney U test was applied to check median differences between group of patients and complications. Chi-square test was also run to check association between group of patients and complications. p -value < 0.05 was considered statistically significant.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

RESULTS

Of total 300 cases, there were 150 neonates and 150 infants. The overall observed complications were in 26 (8.7%) cases, involving 10/150 (6.7%) neonates and 16/150 (10.7%) infants. Amongst 26 cases with complications, the most common complication in neonates and infants were delayed ring separation ($n=11$, 42.3%), followed by proximal migration of the ring ($n=7$, 26.9%), bleeding ($n=5$, 19.2%) and infection ($n=3$, 11.5%) (Table 1).

A significant difference of ring slough off time was observed between neonates and infants (p value < 0.001). However, this time was not found to be related to complication developed (p -value 0.218) (Table 2).

Table 1: Baseline characteristics of the participants (n=300)

Characteristics	Median	IQR
Age in days	45.0	25-210
Ring slough off in days	6.0	5.0-8.0
Surgery duration in minutes	5.0	5.0-5.0
	n	%
Group of patients		
Neonate	150	50.0
Infant	150	50.0
Complications		
Yes	26	8.7
No	274	91.3
Type of complication (n=26)		
Delayed ring separation	11	42.3
Bleeding	5	19.2
Infection	3	11.5
Proximal migration ring	7	26.9

IQR: Interquartile range

Table 2: Comparison of ring slough off and complications among neonates and infants (n=300)

Variables	Neonate	Infant	p-value
	(n = 150)	(n = 150)	
Ring slough off in days, <i>Median (IQR)</i>	5.5 (5.0-6.0)	8.0 (7.0-8.0)	< 0.001*
Complications,	n (%)	n (%)	
Yes	10 (6.7)	16 (10.7)	0.218**
No	140 (93.3)	134 (89.3)	

*p-value has been calculated using Mann-Whitney U test
**p-value has been calculated using Chi-square test

Table 3: Comparison of complications with ring size & ring slough off (n=300)

Variables	Complications		p-value*
	Yes (n = 26)	No (n = 274)	
	Median (IQR)	Median (IQR)	
Ring size in cm	1.4 (1.3-1.5)	1.4 (1.3-1.4)	0.135
Ring slough off in days	6.5 (6.0-7.0)	6.0 (5-8.0)	0.977

*p-value has been calculated using Mann-Whitney U test

An insignificant difference of ring size was also observed in complicated and uncomplicated cases (p value=0.135). Similarly, ring slough off time was also found to be insignificant (p value=0.977) (Table 3). The difference between the types of complications between neonates and infants is shown in figure 2.

DISCUSSION

With minimal trauma, the cosmetic outcome of Plastibell method made it a patient friendly procedure.¹² Conveniently, a device that measures the glans size is available, however an experienced surgeon can judge the girth of glans and is common by retracting prepuce skin. An important aspect of undersized and oversized rings shows that they may result in tissue necrosis along with retained plastibell device and proximal migration of ring respectively.¹³ During clinical trials babies undergo circumcision without analgesia.¹⁴ Sensorial Saturation (SS) technique has neurological and physiological nature, as a result of which the neonate's mind can "filter" the surrounding stimuli through a "gate control system". The mentioned stimuli "saturate" the central receptors, leading to a so called "sensorial jam" that rectifies the painful stimuli. Sensorial saturation (SS), apart from a "technique", is a way of keeping the confidence of parents and making them the protagonists of this surgical situation.^{15,16} Complication rate with plastibell technique has been explored to be around 2% to 11%.^{7,9,17} Our study shows lower rates of complication by Plastibell method in neonates as well as in infants which corresponds to a study with lower rate of complication observed even in older children.^{18,19}



Figure 1: (a) Double reef knot ventral to glans (b) and a single knot on its dorsal aspect

In our study, ring impaction is the most common complication followed by proximal ring migration and bleeding. Studies reported that bleeding can be controlled by tight ligature around the bell and use of accurate sized bell which snugly fits itself on two thirds of the glans over the frenular fold.¹⁹⁻²²

We observed bleeding as complication more common in neonates. Other complications are ring impaction, delayed separation of the ring, slippage of the ring proximally over the glans, and excessive removal of skin etc.²⁰ Meticulous placement of the Plastibell device over the glans and a proper tightening of cotton thread over the groove of Plastibell ring is of extreme importance in refraining from these complications.

In our study, the average time of surgery recorded is comparable to that in literature. A study has reported that Plastibell procedure requires short time.²¹ The tightened ring usually sloughs itself within ten days of the procedure.^{22,23} Also, the ring separates early in neonates because of thin prepuce skin.²⁴ In a literature, the mean time for the Plastibell ring to detach from the foreskin of glans was earlier in lower age group children.²⁰ Secondly, the sizes of the plastibell ring were also not a depicter of earlier separation of ring.²³ In our study, the time taken for the ring to slough off was earlier in neonates as compared to infants, which proves the above documentation in the literature. Also, our study supports the evidence that ring slough off time and ring size are not related to the complications, and therefore it points to the satisfactory outcome in infants with least complications.²⁵

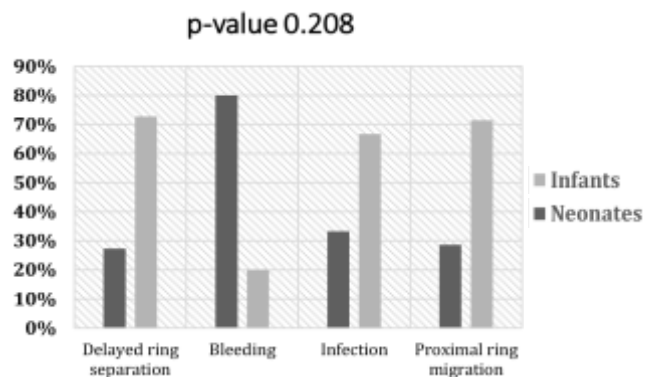


Figure 2. Distribution of type of complications by group of patients (n=26)

These concepts help the surgeons to proceed with Plastibell technique without hesitancy till one year of age, even if there is difference in prepuce skin thickness which differs with age or race.

The limitation of this study is the need to be conducted above one-year age and a larger sample size should be sought in future.

CONCLUSION

Plastibell circumcision stands a place of the safest procedure with short learning curve among all other circumcision techniques. The overall complication rate was minimal, also the comparison of complications between neonates and infants was not significant, which provides enough evidence that this technique can be proceeded without hesitancy above neonatal age group. The only theme that differs between the two groups is ring separation time, which itself is not related directly to the complications and hence does not hinder the Plastibell technique to be performed in a year-old child. The proper technique of the whole procedure including the adequate placement of the ring with meticulous tying of the knots, has weightage in considering its effectiveness and lower rates of complications.

AUTHORS' CONTRIBUTION: MDM, MANB substantially contributed to the conception and design of the study. MDM worked in the acquisition, analysis, and interpretation of data, MANB drafted the manuscript, MDM revised it critically for important intellectual content gave the final approval of the manuscript.

CONFLICT OF INTEREST: None

FUNDING: None

REFERENCES

- Collier R. Circumcision indecision: the ongoing saga of the world's most popular surgery. *CMAJ* 2011; 183:1961-2.
- Darby R. "Where doctors differ": the debate on circumcision as a protection against syphilis. *Soc Hist Med* 2003; 16:57-78.
- Weiss HA, Larke N, Halperin D, Schenker I. Complications of circumcision in male neonates, infants and children: a systematic review. *BMC Urol* 2010; 10:2.
- Bode CO, Ademuyiwa AO, Jeje EA, Elebute OA, Ikhisemojie SO, Adesanya OA. Preferred methods of male neonatal circumcision among mothers in lagos Nigeria. *J West Afr Coll Surg*. 2011; 1:29-37.
- Palit V, Menebhi DK, Taylor I, Young M, Elmasry Y, Shah T. A unique service in UK delivering Plastibell® circumcision: review of 9-year results. *Pediatr Surg Int* 2007; 23:45-8.
- Jimoh BM, Odunayo IS, Chinwe I, Akinfolarin OO, Oluwafemi A, Olusanmi EJ. Plastibell circumcision of 2,276 male infants: a multi-centre study. *Pan Afr Med J* 2016; 23:35.
- Rafiq K. Plastibell-A quick technique to decrease the distress of neonatal circumcision. *Ann King Edward Med Univ* 2000; 6:412-3.
- Hirji H, Charlton R, Sarmah S: Male circumcision: a review of the evidence. *J Mens Health Gend* 2005; 2: 21-30.
- Bode CO, Ikhisemojie S, Ademuyiwa AO. Penile injuries from proximal migration of the Plastibell circumcision ring. *J Pediatr Urol* 2010; 6:23-7.
- Moosa FA, Khan FW, Rao MH. Comparison of complications of circumcision by 'Plastibell device technique' in male neonates and infants. *J Pak Med Assoc* 2010; 60:664.
- Shah T, Raistrick J, Taylor I, Young M, Menebhi D, Stevens R. A circumcision service for religious reasons. *BJU Int* 1999; 83:807-9.
- Khan NZ. Circumcision- A universal procedure with no uniform technique and practiced badly. *Pak J Med Sci* 2004; 20: 173-4.
- Lazarus J, Alexander A, Rode H. Circumcision complications associated with the Plastibell device. *S Afr Med J* 2007; 97: 192-3.
- Bellieni CV, Rocchi R, Buonocore G. The ethics of pain clinical trials on persons lacking judgment ability: much to improve. *Pain Med* 2012; 13:427-33.
- Bellien CV, Aloisi AM, Ceccarelli D, Valenti M, Arrighi D, Muraca MC, et al. Intramuscular injections in newborns: analgesic treatment and sex-linked response. *J Maternal Fetal Neonatal Med* 2013; 26: 419-22.
- Bellieni CV, Tei M, Coccina F, Buonocore G. Sensorial saturation for infants' pain. *J Matern Fetal Neonatal Med* 2012; 25:79-81.
- Manji KP. Circumcision of the young infant in a developing country using Plastibell. *Ann Trop Paediatr* 2000; 20: 101-4.
- Netto JM, Araujo Jr JG, Noronha MF, Passos BR, Lopes HE, Bessa Jr JD, et al. A prospective evaluation of plastibell® circumcision in older children. *Int Braz J Urol* 2013; 39:558-64.
- Samad A, Khanzada TW, Kumar B: Plastibell circumcision: a minor surgical procedure of major importance. *J Pediatr Urol* 2010; 6: 28-3.

20. Palit V, Menebhi DK, Taylor I, Young M, Elmasry Y, Shah T. A unique service in UK delivering Plastibell circumcision: review of 9-year results. *Paediatr Surg Int* 2007; 23: 45-8.
21. Nnamonu MI. Circumcision: experience at a private hospital in jos, Nigeria. *Niger J Surg* 2013; 19:1-3.
22. Hammed A, Helal AA, Badway R, Goda SH, Yehya A, Razik MA, et al. Ten years experience with a novel modification of plastibell circumcision. *Afr J Paediatr Surg* 2014; 11:179-18.
23. Mihssin N, Moorthy K, Houghton PW. Retention of urine: an unusual complication of the Plastibell device. *BJU Int* 1999; 84: 745.
24. Netto JM, Araujo Jr JG, Noronha MF, Passos BR, Lopes HE, Bessa Jr JD, et al. Prospective randomized trial comparing dissection with Plastibell® circumcision. *J Pediatr Urol* 2010; 6: 572-7.
25. Rasool N. Incidence of Complications in Plastibell Circumcision in Male Infants: Comparison between with and without Coagulation Hemostasis methods. *J Surg Surgical Res* 2017; 3:34-7.

