

Circumcision; Open vs Plastibell techniques: which is better?

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Abstract

Objective: To compare the results of circumcision by open technique and the Plastibell technique in male babies.

Materials and Methods: In this randomized controlled interventional study, 1440 babies whose circumcision was done as religious rite were divided into two groups. Group A underwent circumcision by open technique whereas group B underwent circumcision by Plastibell method.

Results: Majority 720 (50%) were in age group 6-8 weeks. Compared with open method, significantly less number of patients in plastibel method experienced moderate pain (47.91% versus 35% p value .00001 and severe pain 31.94% versus 9.02% p value .00001. Rate of wound infection was significantly less in plastibell method 2.77% versus 4.86% p value .020. However more patients in plastibell technique needed re-do circumcision 4.02% versus 1.94% p value .0202. Overall greater parent's satisfaction was attained with plastibel method.

Conclusion: Plastibell technique has many advantages over open method in terms of less post op pain, wound infection, and greater cosmetic satisfaction however more patients will need re-do circumcision in this technique compared with conventional method. Open method is better in term of securing hemostasis.

Keywords: Circumcision, open technique, Plastibell, post-op complications.

Introduction

Circumcision is perhaps the most common surgery done^{1,2,3}. Throughout the world, millions of male neonates and infants undergo circumcision for religious, cultural, social and medical reasons^{4,5}. In Pakistan, it is usually observed that the majority of males undergo circumcision from newborn to adulthood, nevertheless it is most commonly practiced in the first year of life^{6,7,8}. It is a simple operation in both infants and young children and healing is usually complete in two weeks. The benefits of circumcision have been described in numerous studies such as the reduced risk of penile cancer, urinary tract infections (UTIs), sexually transmitted diseases (STDs) and lower HIV prevalence^{7,8}.

Various techniques are available for circumcision namely Plastibell, Gomco clamp, Mogen clamp, bone cutter method and dorsal slit (open cut) method^{9,10,11}. Out of these, Plastibell method has become quite popular and appears to be more preferable procedure particularly in the age group ranging from neonates to 1st year of life^{12,13}. The reason may be this technique being a quick, easy, least traumatic with minimal blood loss and having least number of complications. It also provides very good cosmetic results^{14,15}.

However, complications of Plastibell circumcision include bleeding, bell impaction, localized infection, dysuria, inadequate skin removal, excessive loss of skin, incomplete separation of Plastibell device, proximal migration of ring under the prepuce with prolapse of glans through the ring¹⁶.

Plastibell circumcision like any other surgical procedure requires an aseptic technique¹¹. The use of local anesthesia for the procedure is recommended for neonates and for older children^{13,15,16,17}. Coagulation profile is mandatory prerequisite for circumcision but is not routinely practiced except where the family history of coagulopathy is present^{18,19}.

The operating time for procedure exclusive of local anesthesia is 5 to 10 minutes. The Plastibell device is available in sizes ranging from 1.1 cm to 1.7 cm and is correlated to the size of glans of the penis. An appropriate bell size which snugly fits in 2/3rd of the glans should be used. Thread should be tight enough to cause the

ischemia of the foreskin. If the thread is not securely tightened or if the skin is too thick as in the older children, it will result in incomplete/delayed ring separation. Smaller bell size may result in tissue necrosis and larger bell can migrate proximally and get impacted^{19,20,21}.

If the rate of known complications are established for a particular technique, it is easier for the surgeons to decide the appropriate method of circumcision according to the appropriate age group^{22,23,24}.

Objectives: This study was to compare the benefits and the possible risks associated with the open and Plastibell methods of circumcision. Rationale of the study was to formulate feasible recommendations for the young surgeons on the basis of results of this study.

Operational Definitions

Circumcision was defined as the 'cutting off' of the foreskin of male that is practiced as a religious rite by Jews and Muslims and by others as a social custom or for potential benefits such as improved hygiene.

Operative time was defined as time between the start of the surgery (incision) and finish of the surgery.

Post-operative bleeding was defined as bleeding after a surgical procedure which may occur immediately after the surgery or be delayed and need not be restricted to the surgical wound.

Redo circumcision was a second surgical procedure performed due to unsatisfactory results with the original circumcision.

It was performed as early as possible in case of excessive post operative bleeding (within 5-10 minutes of the first surgery).

An **infected wound** is a localized defect or excavation of the skin or underlying soft tissue in which pathogenic organisms have invaded into viable tissue surrounding the wound.

A **wound dressing** is a sterile pad or compress applied to a wound to promote healing and protect the wound from further harm.

Materials and Methods

This randomized controlled experimental trial was done in the surgical unit of District headquarters hospital, Rawalpindi and the Raazi Hospital, Rawalpindi for two years, from July 2017 to June 2019. This study was started after

approval of the ethical committee of the DHQ hospital.

Total of 1440 babies from 06 weeks to 06 months of age were enrolled in the study that were randomized to either open method (n=720) or plastibell method (n=720) for circumcision. Sample size was calculated using the WHO formula keeping the confidence interval of 95% , margin of error 5 and population proportion of 96%⁷. Babies with clinical jaundice, hypospadias, deranged bleeding time (BT) and clotting time (CT) were excluded from the study. Informed consent including the possible complications of the procedure was taken from the parents of the all babies. All the procedures were performed by the same surgeon. After washing the perineal area with 2% Povidone Iodine solution, procedure was performed under aseptic measures. Area was anesthetized by injecting 0.2% Xylocaine local anesthetic at the base of penis anesthetizing the dorsal nerve of penis which took about one minute to be effective.

Group A patients were subjected to the conventional open technique. In this method first the prepuce was retracted to wipe out the smegma. Foreskin was excised till the proposed level exposing the neck of the glans. Hemostasis was secured by ligating the active bleeding vessels with absorbable chromic catgut 3/0 suture. Wound was dressed with Pyodine soaked gauze pieces.

Group B babies were subjected to the Plastibell technique of circumcision. In this method, smegma cleaned as in group A. Here redundant skin was not excised but a Plastibell device appropriate to the size of the glans of the baby was introduced into the fore skin(size of Plastibell ranges from 1.1 cm to 1.7cm). Foreskin was tightened over the ridge of the bell at the desired level of circumcision. Handle of the bell is separated from the rest of the bell and excessive foreskin cut just beyond the outer rim of the bell (Figure 1). This tightened suture causes the ischemic necrosis of the distal skin which falls off at about 5-9th postoperative day. Patients of both groups were observed for 15 minutes post operatively.

All patients were advised Amoxicillin drops for protection against infection and Paracetamol drops for pain relief for seven post -operative days. Parents were educated regarding wound dressing in group A and wound care in group B.

Parents were advised to return to the hospital in case of any complication like bleeding, skin problems.

After seven post op days, all the circumcised babies were followed up in OPD (out patients department) regarding wound status, falling off of the bell with redundant foreskin, parent's satisfaction regarding the result of the circumcision and any other complication. Re-do circumcision was done by open method.

Data regarding age of the baby, post op pain, need of change of dressing, need of re-do circumcision and parent,s satisfaction regarding cosmetic results were recorded and analysed.

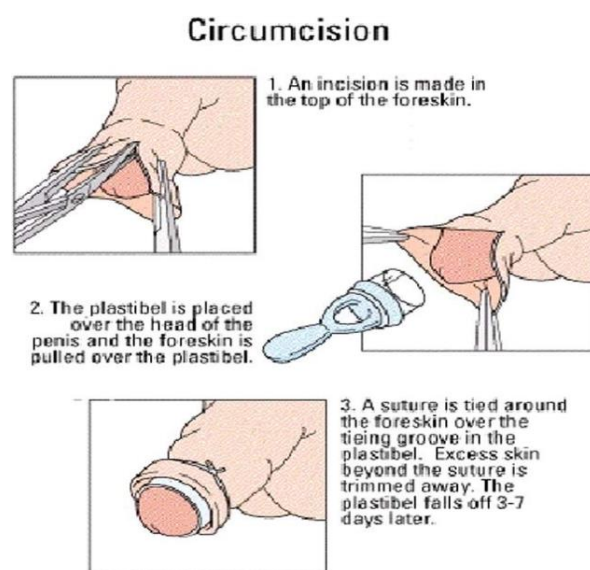


Figure 1: Plastibell technique of circumcision

Results

Table 1: Age groups

Age	Number of babies (n)	Percentage (%)
06 weeks to 08 weeks	720	50
02 months to 03 months	360	25
03 months to 04 months	216	15
04 months to 05 months	72	5
05 months to 06 months	72	5

Most of the study population was six weeks to 3 months old. Most of the subjects in open method had moderate pain 345 (47.91%) and severe pain 230(31.94%). That makes almost 71% of the patients with moderate to severe pain. Pain was less marked in plastibel method in which 252

(35%) experienced moderate and 65(9.02%) had severe pain which is almost 44% patients with moderate and severe pain. Overall results were highly significant. Severity of pain was assessed on the frequency of need of paracetamol drops (Table 2).

Table 2: Post-operative pain

Group	Mild pain a	Moderate pain b	Severe pain c	Total
A (Open)	145 (20.13%)	345(47.91%)	230(31.94%)	
B (Plastibell)	403(55.97%)	252(35%)	65(9.02%)	a)Test static =228.2427
B) Multiple Comparison	a ≠ b+c	b ≠ a+c	c ≠ a+b	0.00001*
Chai square value	196.09	24.74	116.065	
P value	.00001*	.00001*	.00001*	

a. Chai square test, b multiple comparison tests using Bonferroni correction

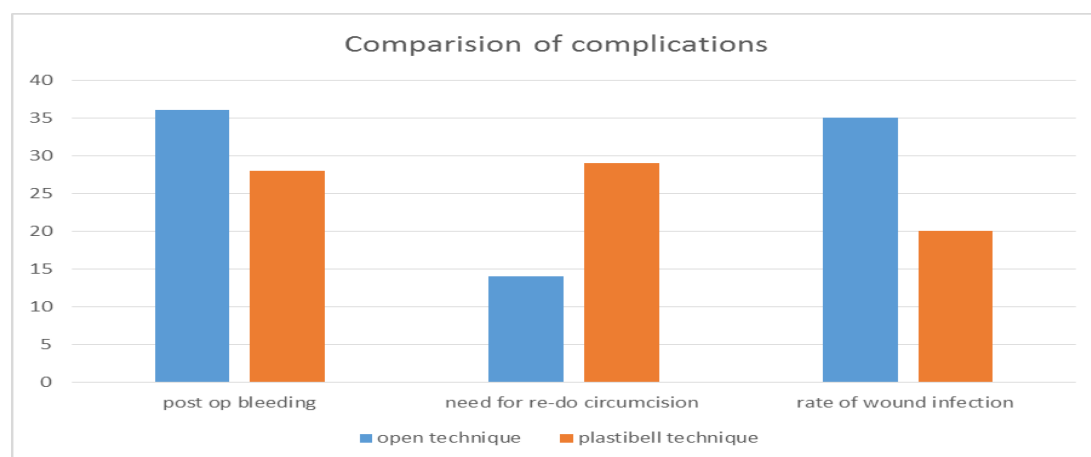


Figure 2: Comparison of complications between two groups

P value for chai square test. Post op bleeding .306, need for re-do circumcision .0202*, rate of wound infection .0391*

There was no significant difference in post operative bleeding between two groups (P value 0.306). However significantly more patients needed re-do circumcision with plastibell method 4.02% versus 1.94% (p value .0202). The

main reason of re-do surgery was excessive post operative bleeding. Rate of wound infection was significantly less with plastibel method (figure 2). Overall greater parental satisfaction was achieved with plastibell technique (Table 3).

Table 3: Parents' satisfaction regarding the cosmetic result

Group	Excellent	Good	Satisfactory	Poor	P value
A (open)	396 (55%)	195 (27.08%)	57 (7.91%)	72 (10%)	Test static 181.111
B (plasti-bel)	612 (85%)	72 (10%)	29 (4.02%)	7 (.97%)	P value .00001

Discussion

In our study complication rate was 2.77% in Plastibell method while it was 4.0% (4.89 % in open method. Carolina T et al reported nearly similar overall

complication rates in open method and in Plastibell method i-e 3.4% and 3.0% respectively¹⁹.

Moinuddin M et al compared these two methods of circumcision in childhood and concluded that the PD procedure is a satisfactory method²⁰. Plastibell

technique is the most common technique used for neonatal circumcision around the world^{18,9,20,23}.

As reported in other studies^{20,21}, an obvious advantage of using the Plastibell was the shorter time of surgery. Average surgery time in group B was 5 minutes compared to 10 minutes in group A.

Circumcision causes pain which may interfere with mother-infant interaction or cause other behavioral problem so good analgesia is used^{15,16,17,21,22,23}. In our study 32% patients in group A had severe post op pain while 9% patients in group B had severe pain. Severity of the pain was judged on the basis of the frequency of the analgesic drops needed for pain relief.

In our study, post op bleeding occurred in 5% of open group and 4 % of the Plastibell group. Bawazir OA also observed bleeding in 4% of circumcised children²⁵.

In our study, local infection rate was 2.77% in Plastibell group while it was 4.86% in open method group. Razzaq S et al reported such infection in 3.21% neonatal Plastibell circumcision²¹. Moosa FA et al reported 4.86% and Bawazir OA 2.9% local infection rate^{25,33}. As the infection criterion in our study and the other studies was only clinical, it might be under estimated

Average separation time of bell was 7 days (range between 4-10 days). Delayed separation was observed in 3% of the PD group. It was noted that ring separated earlier in younger children than the older children. This might be due to the thin prepuce and the earlier sloughing of the foreskin^{19,23}.

We had five cases (1.3%) of redundant mucosa in Plastibell group that may be due the inappropriately sized bell. The choice of a correctly sized bell is important. If the bell is too small, it causes compression of the glans and edema thus leading to micturition difficulty. If the bell is too large, proximal or distal dislocation can occur²⁴.

Parents of 55% babies in group A had excellent satisfaction regarding the results of the procedure while such level of satisfaction was 85% in group B. Other studies also quote such benefit^{10,20,21}.

There are few limitations in this study. First, a variety of surgical methods of neonatal circumcision are available and this study just compared two methods. Secondly, the lower complication rate after Plastibell circumcision cannot be externalized to the non- surgical approaches like Gomco clamp. We are planning to follow up the possible long term complications as in other studies.

Conclusion

Circumcision should be performed by experienced surgeon. Plastibell method is better than open technique in terms of decreased postoperative infection rate, less need of post op analgesia, more parents' satisfaction in term of cosmetics. Plastibell technique should be converted to open method in case of excessive bleeding or other intra operative complications. Open method is better in term of securing operative hemostasis. When needed, re-do circumcision should be done with open method. Plastibell technique should preferably be used in neonatal period while open method is better in infants as they are more prone to develop post- operative complications due to comparatively thick prepuce and their more active nature.

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