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Circumcision with A Stapler Compared To Conventional Circumcision

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Abstract

Male circumcision is one of the earliest operations performed by humans. This procedure has the potential to decrease the risk of sexually transmitted diseases such as human papillomavirus, genital ulcer disease, and human immunodeficiency virus (HIV) infection [1]. Additionally, it improves penile topical hygiene and reduces the incidence of balanitis and penile cancer. This is indeed influenced by several factors such as culture, beliefs, ethnicity, tradition, and health factors. In terms of community health, circumcision has advantages in preventing HIV disease. And from a medical point of view, it can reduce the rate of transmission of sexually transmitted diseases. Conventional male circumcision as recommended by the World Health Organization (WHO) includes three techniques: the dorsal slit, the forceps-guided method, and sleeve resection [2]. Research indicates that circumcision devices can reduce the complexity and duration of the male circumcision procedure; however, the high number of circumcisions performed can be demanding on both human and financial resources.

Keywords: Blood Loss, Genitalia, Post Operative Pain, Recurrent Balanitis

Introduction

Circumcision is a procedure that removes the foreskin from the human penis. In the most common form of the operation, the foreskin is extended with forceps, then a circumcision device may be placed, after which the foreskin is excised. Topical or locally injected

anaesthesia is generally used to reduce pain and physiologic stress. Circumcision is generally electively performed, most commonly done as a form of preventive healthcare, as a religious obligation, or as a cultural practice. Circumcision is one of the world's most common and oldest medical procedures. Prophylactic usage originated in England during the 1850s and subsequently widely spread, becoming predominately established as a way to prevent sexually transmitted infections. Beyond use as a prophylactic or treatment option in healthcare, circumcision plays a major role in many of the world's cultures and religions, most prominently Judaism and Islam. Circumcision is among the most important commandments in Judaism. In some African and Eastern Christian denominations male circumcision is an established practice, and require that their male members undergo circumcision.

Aim

To compare effectiveness of stapler circumcision over conventional circumcision in

-Operative time

- Blood loss

- Post Operative complications

- Post Operative Pain

Methodology

Inclusion Criteria

Patients in whom circumcision is indicated and willing for surgery

Men between 18 to 70 years of age

Redundant prepuce or Phimosis

Social or religious purpose

Recurrent balanitis

Recurrent balanoposthitis

Exclusion Criteria

Acute infection of genitalia like acute posthitis or balanitis

Thickened prepuce secondary to chronic inflammation

Severe foreskin adhesion

Concealed penis

Sexually Transmitted Diseases

Malignancy

Study Setting

General Surgery Department of SSG Hospital, Vadodara.

Study started from approval by Institutional Ethics Committee from October 2023 to August 2024.

Sample Size

A total of 100 patients and 50 patients in each group

Statistical Analysis

t-test was used to compare Operative time, Blood loss, Healing time.

Nonparametric Mann-Whitney test was used to compare Pain scores.

Chi-square test was used to compare Incidence of complications.

Methodology

All the patients included in the study were evaluated by detailed history, general examination, clinical examination and basic investigations.

Special investigations were done as and when required.

From these, those patients who fit in the inclusion criteria were selected and divided into two groups alternatively.

All patients were given penile block/spinal/short general anaesthesia.

After surgically scrubbing the penis with povidone iodine, a dorsal penile nerve block and circumferential nerve block were performed with 2% lidocaine.

Group A receives circumcision with a stapler.

Equipment required in group A - Circumcision Stapler

Group B receives circumcision with conventional suturing method

Equipment required in group B – Polyglactin Suture

The patient fitting into the criteria of study population were explained the procedure thoroughly, written consent was taken.

Requirement of additional anaesthesia

If penile block was not effective short sedation or spinal anaesthesia may be required.

A Levonorgestrel 0.05 microgram at night was given post operatively for one day.

Methods Used In Group A (Stapler Circumcison)

Equipments required in group A –Circular Stapler

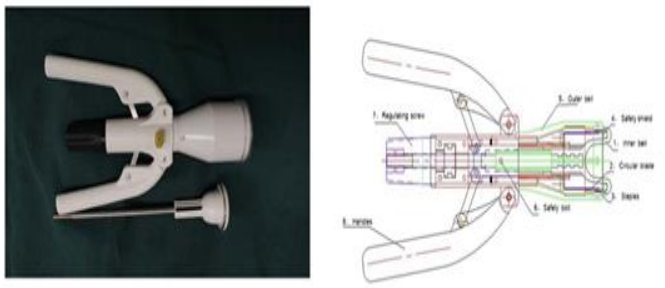


Figure 1: Stapler Circumcision device

Penile diameter was measured just below the glans to determine the appropriate size of the stapler device.

Figure 2: Measurement of penile diameter

Position: The patient is made to lie in supine position. After surgically scrubbing the penis with povidone iodine, a dorsal penile nerve block and circumferential nerve block were performed with 2% lidocaine.

Figure 3: Dorsal Penile Nerve Block

The inner bell was placed inside the foreskin to cover the glans, the edge of the bell was at the level of coronal sulcus

Figure 4: Placement of inner bell inside the foreskin

If the patient had severe phimosis, a dorsal slit made to correctly position the inner bell. The safety shield was removed from the outer bell.

Figure 5: Removal of safety shield

Outer bell was placed over the inner bell. The frenulum should be kept intact. The safety bolt was then removed.

Figure 6: Removal of safety bolt

The screw was rotated clockwise to sandwich the foreskin tightly, the handles were triggered to cut the foreskin, and wound was closed by staples at the same time.

Figure 7: Firing of stapler

The device was unscrewed and removed.

Figure 8: Unscrewing of device

The wound in foreskin was checked and pressed with gauze for 1 to 2 min to stop any bleeding.

Figure 9: post-stapler circumcision wound

Haemostasis was achieved with a compression bandage.

Figure 10: Haemostasis after stapler circumcision

Methods Used In Group B (Conventional Circumcision)

Anesthesia:

For adults: LA (penile block)

For dorsal penile nerve block: 0.5% bupivacaine and 1–2% lidocaine without epinephrine is used (with epinephrine, there is a risk of local tissue ischemia)

Position: The patient is made to lie in supine position.

After painting and draping, isolate the part. Lubricate probe with xylocaine jelly (lignocaine) and introduced between prepuce and glans; checked for any adhesions. If present, then rotated the probe circumferentially to break them. Can also use mosquito forceps (lubricated with xylocaine jelly)—passed it till coronal sulcus. Open the forceps and removed it with blades kept open, this helped to break adhesions. Retracted the prepuce to expose coronal sulcus. Cleaned smegma with povidone–iodine and saline. Returned the prepuce to its normal position. Prepuce was held at 3 and 9 o'clock positions with mosquito forceps and pulled forward with light traction. Prepuce was cut at 12 o'clock position after crushing with straight

artery forceps.

Figure 11: Prepuce held at 3 and 9 o'clock positions

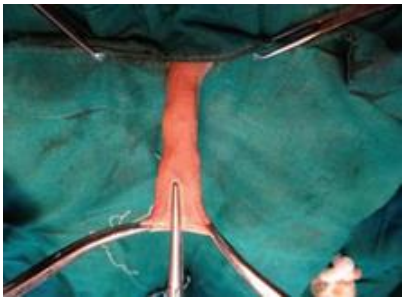


Figure 12: Crushing of prepuce at 12,o clock

Figure 13: Cutting prepuce at 12,o clock

Outer skin was separated from inner skin and cut parallel to corona all around. Inner layer (mucosa) was held at 3 and 9 o'clock positions, cut parallel, leaving a cuff approximately 0.3 cm long, which just covers corona of glans. Achieved haemostasis by ligation of frenular vessel ventrally (branch of internal pudendal artery) by one of the following:

Figure of 8 stitch

Frenal stitch (U stitch)

Mattress suture

Figure 14: Figure of 8 stitch

Dorsal vein of penis and other bleeders—bipolar cautery was used to achieve haemostasis, or ligation with polyglactin 910 (vicryl 3.0) suture. Outer and inner layers are closed with fine interrupted absorbable poliglecaprone (monocryl3'-0) suture

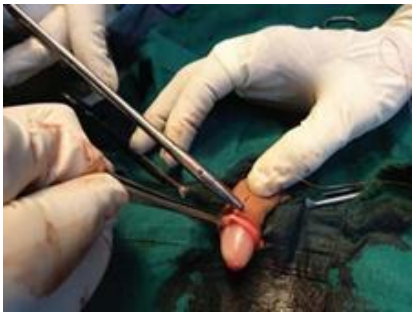


Figure 15: Suturing with Monocryl

Ideal circumcision should look like an 'egg in an eggshell'.

Figure 16: Egg in an eggshell appearance

Dressing

Applied emollient dressing.

Covered it with dry gauze piece.

Applied micropore dressing.

From the next day, wound was kept open.

Cleaned daily with warm water and applied Neosporin ointment.

Oral Antibiotics (tablet cefixime) was given for 3 days.

Levonorgestrel 0.04mg was given for at night for 1 week post operatively.

Results

The present study was conducted among 100 male patients operated with two different surgical methods: Conventional Circumcision and Stapler circumcision. The aim of the study was to compare two different methods in terms of procedure time, hospital stay and post-surgical complications

Table 1: Age-group wise distribution of patients (n-100)

Age Group	Type of Surgery				
	Circumcision		Stapler Circumcision		chi square test (p value)
	Frequency	%	Frequency	%	
<20	8	16	5	10	
20-40	26	52	30	60	1.05
40-60	9	18	9	18	(.788)
≥60	7	14	6	12	
Total	50		50		

Graph 1:

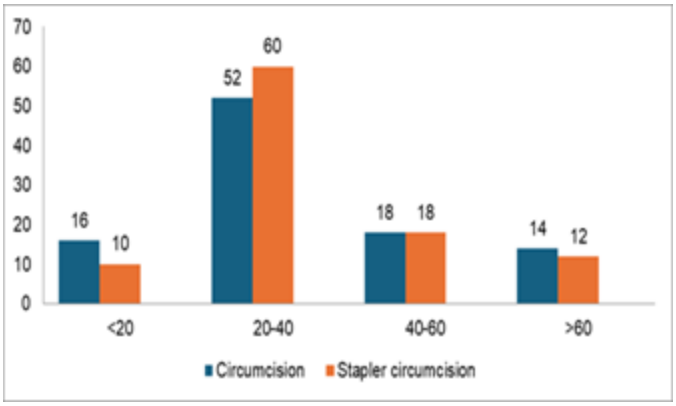
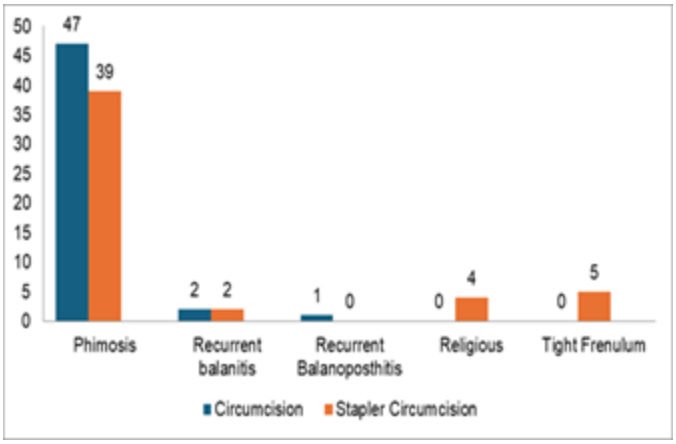


Table 2: Clinical Diagnosis of the patients (n-100)

Clinical Diagnosis	Type of Surgery				
	Circumcision		Stapler Circumcision		chi square test (p value)
	Frequency	%	Frequency	%	
Phimosis	47	94	39	78	
Recurrent Balanitis	2	4	2	4	
Recurrent Balanoposthitis	1	2	0	0	10.74 (0.030)
Religious	0	0	4	8	
Tight Frenulum	0	0	5	10	
Total	50		50		

Graph 2: Clinical Diagnosis of the patients (n-100)



Above table and figure show distribution of patients in both the groups with their clinical diagnosis. There was no statistical significant difference was observed in both the groups. Therefore, it could be concluded that both the groups were comparable in terms of clinical diagnosis.

Table 3: Surgical details of the patient (n-100)

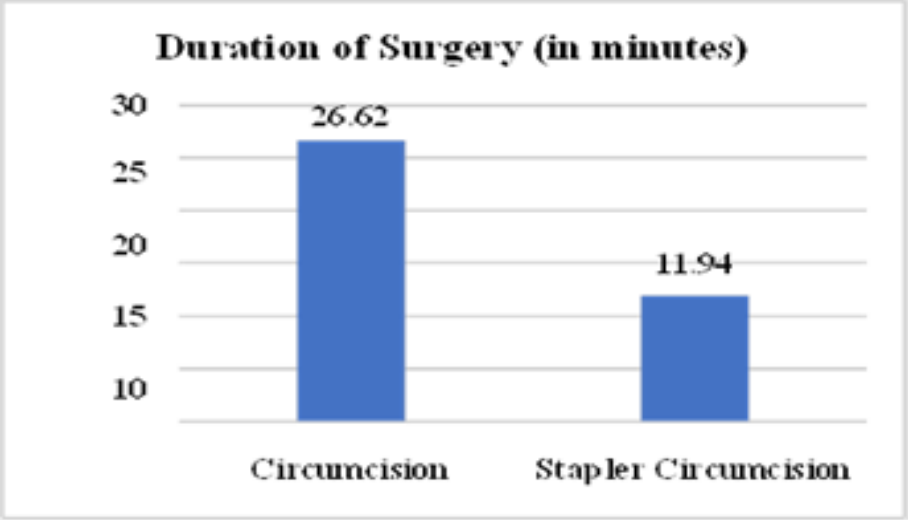
Name of Surgery	Frequency	Percentage (%)
Circumcision	50	50.0
Stapler Circumcision	50	50.0

The above table shows the surgical details of the patients. Out of total, half were operated through classical circumcision method and half were operated through the stapler circumcision method.

Table 4: Duration of Surgery

Variable	Type of Surgery				Independent t test (p value)
	Circumcision		Stapler Circumcision		
	Mean	SD	Mean	SD	
Duration of Surgery (in minutes)	26.62	3.12	11.94	1.86	28.48(<0.0001)

Graph 3: Duration of Surgery

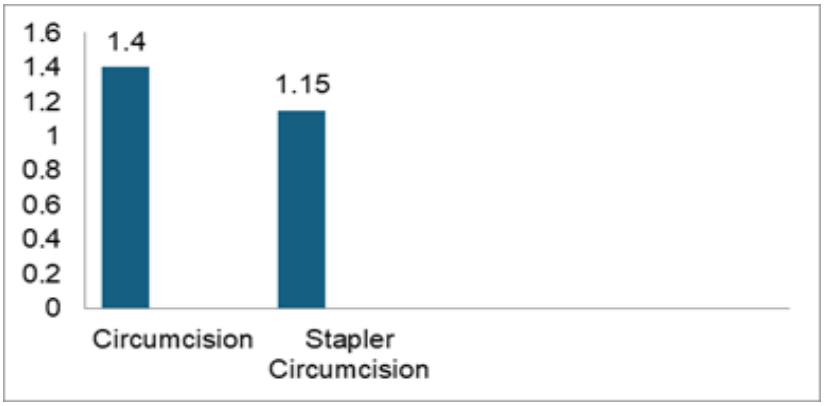


Duration of surgery was compared for both the methods. There was statistically significant difference between the duration of surgery. It could be said that the duration of surgery was lesser in stapler circumcision method as compared to the classical circumcision method.

Table 5: Blood Loss during Surgery

Variable	Type of Surgery				Independent t test (p value)
	Circumcision		Stapler Circumcision		
	Mean	SD	Mean	SD	
Blood Loss during Surgery (in grams)	1.4	0.12	1.15	0.09	11.43 (<0.001)

Graph 4: Blood Loss during Surgery



The blood loss during the surgery was compared for both the methods and it was observed that there was statistically significant difference between blood losses during the surgery. The mean blood loss was higher in patients with the traditional circumcision method as compared to the Stapler circumcision method.

Table 6: Recovery time

Variable	Type of Surgery				Independent t test (p value)
	Circumcision		Stapler Circumcision		
	Mean	SD	Mean	SD	
Recovery Time (in days)	3.46	0.83	1.36	0.52	15.01(<0.001)

Picture Gallery

Group A (Stapler Circumcision)

Patient 1

Figure 17: A) Pre-op picture of patient 1

Figure 17: B) Post-op picture of patient 1 after 1 month

Patient 2

Figure 18: A) Pre-op picture of patient 2

Figure 18: B) Post-op picture of patient 2

Discussion

Male circumcision (MC) was one of the earliest operations performed by humans. This procedure has the potential to decrease the risk of sexually transmitted diseases such as human papillomavirus, genital ulcer disease, and human immunodeficiency virus (HIV) infection. Additionally, it improves penile topical hygiene and reduces the incidence of balanitis and penile cancer. This is indeed influenced by several factors such as culture, beliefs, ethnicity, tradition, and health factors. Conventional circumcision refers to the traditional surgical method where the foreskin is manually dissected and excised using surgical instruments such as scissors or a scalpel. This technique has been practiced worldwide and is relatively straightforward in execution. However, complications such as bleeding, edema, and unsatisfactory cosmetic results are still common in patients who undergo conventional male circumcision. Moreover, conventional male circumcision is time consuming. Circumcision devices have been developed to shorten the operative time, simplify techniques, and improve safety and cosmetic outcomes. Device-based techniques generally provide protection to the glans. They reliably circumcise adequate foreskin and provide crush haemostasis. This technique is supposedly safer and easier to replicate than the standard dissection techniques. Research indicates that circumcision devices can reduce the complexity and duration of the male circumcision procedure; however, the high number of circumcisions performed can be demanding on both human and financial resources. Over the last 20 years, researchers have developed circumcision devices that are alternative to globally commonly used standard surgical techniques. Stapler circumcision was first described by Dr. Y. C. Chan in 1985. The first commercial stapler circumcision device was introduced in the early 1990s, about 5-7 years after Dr. Chan's initial description. The technique gained popularity in Asia, particularly in China, Korea, and Japan, as a quick and relatively painless alternative to traditional circumcision methods, highlighting its advantages, including reduced bleeding, less pain, and faster recovery. Recent studies have continued to evaluate the stapler circumcision technique, exploring its use in different populations, such as infants, children, and adults, and comparing it to other circumcision methods.

The present study was conducted among 100 male patient operated with two different surgical methods: Circumcision and Stapler circumcision. The aim of the study was to compare two different methods in terms of procedure time, hospital stay and post-surgical complications, conducted in Government Medical College, Baroda & Sir Sayajirao General Hospital, Vadodara from October 2023 to August 2024.

A study with regard to following parameters was made: To compare effectiveness of stapler circumcision over conventional circumcision in

1. Operative time
2. Blood loss
3. Post Operative complications
4. Post Operative Pain

Table 7: Comparison of Duration of surgery between different studies

Our Study			X.D.Jin,et.al			Bo-DongLv,et.al,			AlekhJain,et.al		
Circumcision			Circumcision			Circumcision			Circumcision		
Stapler	Conventional	P-value	Stapler	Conventional	P-value	Stapler	Conventional	P -value	Stapler	Conventional	P-value
11.94±1.8	26.62±3.12	<0.0001	6.8±3.1	24.2±3.2	<0.001	7.6±4.5	21.4±5.8	<0.001	5.35±1.38	5.35±1.38	<0.05

In our study, duration of surgery was compared for both the methods. There was statistically significant difference between the duration of surgery. It could be said that the duration of surgery was lesser in stapler circumcision method as compared to the classical circumcision method.

Table 8: Comparison of Blood loss during surgery between different studies

Ourstudy			X.D.Jin,et.al			Bo-DongLv,et.al,			AlekhJain,et.al		
Circumcision			Circumcision			Circumcision			Circumcision		
Stapler	Conventional	P-value	Stapler	Conventional	P-value	Stapler	Conventional	P-value	Stapler	Conventional	P-value
1.15±0.09	1.4±0.12	<0.0001	1.8±1.8	9.4±1.5	<0.001	3.8±2.6	16.5±4.7	<0.001	2.56±0.38	10.40±1.35	<0.05

The blood loss during the surgery was compared for both the methods and it was observed that there was statistically significant difference between blood losses during the surgery. The mean blood loss was higher in patients with the traditional circumcision method as compared to the Stapler circumcision method.

Conclusion

The study compared traditional and stapler circumcision methods in 100 patients with mean(SD) age of 34.75 (16.95) years. The majority of patients were aged 20-40 years, predominantly from urban areas, and the primary indication for surgery was phimosis. Both methods showed minimal differences in post-surgical pain, hospital stay, and cosmetic outcomes, as indicated by similar VAS scores and cosmesis ratings. Stapler circumcision had a significantly shorter duration of surgery, less blood loss and shorter recovery time compared to traditional circumcision, highlighting its efficiency. Post-surgical complications, such as edema, hemorrhage, and wound infection, were infrequent and not significantly different between the methods.

The stapler method's advantages include reduced surgical time, recovery time and blood loss, making it a preferable choice in terms of procedural efficiency. Overall, both surgical techniques are effective, with stapler circumcision offering practical benefits without compromising safety or cosmetic results.

Summary

The circumcision stapler is an easy and user-friendly device for performing male circumcision. It is associated with a shorter operative time, lower blood loss volume, and fewer postoperative complications than conventional circumcision. This new device may greatly facilitate and standardize circumcision procedures; thus, its popularization would be valuable. With further improvement, it could become the standard male circumcision technique.

Limitations

The limitations of this study are:

- Small sample size
- Another limitation is that this was a single centre study, so multicenter study should be conducted and large-scale results should be published so that a standard procedure is adopted as protocol for circumcision.

- There was no long-term physical follow up of patients so complications like Meatal stenosis, Urethral Fistula could not be studied.
- As we provide free services at Sir Sayajirao General Hospital, Vadodara, cost could not be evaluated in this study

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