

A Comparative Study of Stapler Circumcision Versus Conventional Circumcision in Male Patients

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Abstract:

Background: Circumcision is commonly performed for phimosis, recurrent balanitis, paraphimosis, and other foreskin-related conditions. Conventional circumcision is widely applicable but may require longer operative time, suturing, and meticulous haemostasis. Circular stapler devices combine circumferential excision and stapling in a single application and may improve perioperative outcomes.

Objective: To compare operative time, intraoperative blood loss, postoperative pain, wound complications, healing time, and cosmetic satisfaction following stapler circumcision and conventional circumcision.

Methods: This prospective comparative study was conducted in the Department of Urology at Dr. B. R. Ambedkar Medical College and Hospital from December 2025 to May 2026. Forty-four eligible patients underwent circumcision under local anaesthesia in a day-care or short-stay setting. Twenty patients underwent stapler circumcision and 24 underwent conventional circumcision. Patients were followed at one week, one month, and three months. Statistical analysis was performed using SPSS version 27.0 with ANOVA, chi-square test, and Fisher's exact test.

Results: The mean operative time was 9.1 minutes in the stapler group and 26.12 minutes in the conventional group ($p < 0.0001$). Mean intraoperative blood loss was 3.1 mL and 13.16 mL, respectively ($p < 0.0001$). Postoperative pain scores were significantly lower in the stapler group at 24 hours, 72 hours, and five days. Wound infection occurred in 5.0% versus 8.3%, while oedema/haematoma occurred in 10.0% versus 20.8% in the stapler and conventional groups, respectively; these differences were not statistically significant. Cosmetic satisfaction was reported by 100% of stapler patients and 75% of conventional patients. Mean healing time was 8.6 ± 1.58 versus 13.29 ± 1.35 days ($p = 0.08$).

Conclusion: Stapler circumcision was associated with shorter operative time, lower intraoperative blood loss, and reduced postoperative pain in this study. Conventional circumcision remained more versatile and did not require specialized equipment. Stapler circumcision may be considered in appropriately selected patients after counselling regarding device cost, anatomical limitations, and possible staple or silicone-ring-related issues.

Keywords: Circumcision, Circular Stapler, Conventional Circumcision, Operative Time, Postoperative Pain, Blood Loss, Cosmetic Outcome.

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Introduction

Circumcision is among the most commonly conducted surgical procedures globally. It consists of the excision of the foreskin and is performed for various reasons, including medical, religious, cultural, hygienic, or preventive purposes. In a clinical setting, typical reasons for circumcision encompass phimosis, paraphimosis, frequent balanitis, a tight foreskin during erection, and challenges in maintaining penile hygiene. Additionally, circumcision might be considered for

certain patients with recurring infections or other issues related to the foreskin [1].

Standard circumcision typically entails making an incision and removing the prepuce, followed by controlling bleeding and stitching the wound closed. It is a widely practiced procedure that can be adapted by the surgeon to determine the quantity of skin that is excised. Nevertheless, this method may lead to a longer duration of surgery, bleeding that necessitates

the use of electrocautery or suturing, postoperative discomfort, swelling, and inconsistent cosmetic results that depend on the technique and the surgeon's level of expertise [2].

Circular staplers were created to streamline the circumcision process by merging the circumferential excision with immediate stapling. Typically, the device comprises an inner bell that protects the glans, an outer bell that secures the prepuce, a regulating screw, a safety lock, a circular blade, and titanium staples that are integrated into a silicone ring. Once activated, the prepuce is removed and the edges of the wound are brought together with staples. The silicone ring may be left in place for a short period and will eventually detach as healing occurs [3].

Potential benefits of stapler circumcision include shorter operative time, reduced blood loss, standardization of wound edges, limited tissue manipulation, and increased patient comfort. Nevertheless, this technique requires appropriate device sizing and may not be suitable for patients with xerodermatous balanitis obliterans, tight adhesions of the glans and foreskin, very small or very large glans diameter, active infection, or other anatomical limitations. Equipment cost and staple retention are additional factors [4].

This study compared stapled and conventional circumcisions with respect to perioperative and postoperative outcomes in patients treated at a tertiary care hospital.

Aim and Objectives

Aim: To compare the perioperative and postoperative outcomes of stapler circumcision with conventional circumcision in male patients.

Objectives

- To compare operative time between the two techniques.
- To compare intraoperative blood loss.
- To evaluate postoperative pain at 24 hours, 72 hours, and five days.
- To compare postoperative wound complications, including infection, dehiscence, bleeding, oedema, and haematoma.
- To assess cosmetic satisfaction at three months.
- To compare healing time and silicone-ring separation where applicable.

Materials and Methods

Study Design and Setting: A prospective comparative study was conducted in the Department of Urology, Dr. B. R. Ambedkar Medical College and Hospital, during the period December 2025 to May 2026. Procedures were performed under local anaesthesia in a day-care or short-stay surgical unit.

Sample Size and Groups: A total of 44 patients were included. Twenty patients underwent stapler circumcision and 24 underwent conventional circumcision. The source presentation described the study as comparative but did not provide sufficient information to confirm whether allocation was randomized. Accordingly, the study is reported as prospective comparative rather than randomized.

Eligibility Criteria: Inclusion criteria included males aged 15 years or older with phimosis, paraphimosis, recurrent balanitis, tight foreskin on erection, or another indication for elective circumcision. Exclusion criteria included age below 15 years, balanitis xerotica obliterans, dense glans–prepuce adhesions, active penile infection, and bleeding diathesis.

Patient Selection: Of 64 circumcision referrals screened, 20 were excluded: four because of balanitis xerotica obliterans, eight because of dense adhesions, five because of age below 15 years, and three because of active infection. Forty-four patients were enrolled, with 20 in the stapler group and 24 in the conventional group. All enrolled patients completed follow-up at one week, one month, and three months.

Surgical Techniques: In the stapler group, an appropriately sized inner bell was placed to protect the glans, and the prepuce was positioned between the inner and outer components. The regulating screw was adjusted, the safety lock was released, and the device was activated to excise the prepuce and apply circumferential staples. A silicone gel ring remained as a haemostatic dressing and was expected to separate during healing.

In the conventional group, circumcision was performed using the standard open technique, including preputial excision, haemostasis, and wound closure with sutures according to the operating surgeon's usual practice.

Outcome Measures: Operative time: time from the first incision to wound closure in the conventional group or silicone-ring placement in the stapler group.

Intraoperative blood loss: estimated in millilitres using swab weighing and suction measurements.

Postoperative pain: Visual Analogue Scale (VAS; 0–10) at 24 hours, 72 hours, and five days.

Complications: wound infection, dehiscence, postoperative bleeding, oedema/haematoma, retained staples, and re-intervention.

Cosmetic outcome: patient-reported satisfaction with penile appearance at three months.

Healing time: number of days until complete epithelialisation or silicone-ring separation, as applicable.

Statistical Analysis: Data were analyzed using IBM SPSS Statistics version 27.0. Continuous variables were summarized using means and standard deviations, while categorical variables were expressed as frequencies and percentages. Between-group comparisons were performed using ANOVA, chi-square test, or Fisher's exact test, as appropriate. A p-value <0.05 was considered statistically significant.

Results

Participant Flow: Sixty-four referrals were screened. Twenty patients were excluded because of predefined exclusion criteria, and 44 patients were enrolled. Twenty patients underwent stapler circumcision and 24 underwent conventional circumcision. All 44 patients completed the planned follow-up visits.

Table 1: Baseline characteristics

Characteristic	Stapler (n=20)	Conventional (n=24)	p-value
Mean age (years)	35.6 ± 5.2	37.37 ± 6.1	0.28
Balanitis, n (%)	7 (35.0)	12 (50.0)	0.29
Tight foreskin on erection, n (%)	10 (50.0)	6 (25.0)	0.08
Phimosis, n (%)	3 (15.0)	6 (25.0)	0.35
Diabetes mellitus, n (%)	3 (15.0)	4 (16.7)	0.88
Hypertension, n (%)	2 (10.0)	3 (12.5)	0.79

No statistically significant baseline differences were reported between the groups. The groups were therefore considered comparable for the recorded

characteristics, although the small sample size limited the ability to detect modest differences.

Table 2: Operative time and intraoperative blood loss

Outcome	Stapler	Conventional	p-value
Mean operative time (minutes)	9.1	26.12	<0.0001
Mean blood loss (mL)	3.1	13.16	<0.0001

The stapler procedure required substantially less operative time than conventional circumcision. Mean blood loss was also lower in the stapler group.

The presentation described the operative time as approximately 65% shorter and bleeding as approximately 76% lower with stapler circumcision.

Table 3: Postoperative pain

Time point	Stapler VAS	Conventional VAS	p-value
24 hours	3.6 ± 1.46	5.0 ± 1.17	0.001
72 hours	2.35 ± 0.81	4.0 ± 1.10	0.0001
5 days	1.45 ± 0.51	2.66 ± 0.76	0.0001

Postoperative pain scores were significantly lower in the stapler group at all assessed time points. Pain

decreased progressively in both groups over the postoperative period.

Table 4: Complications and cosmetic outcome

Complication/outcome	Stapler (n=20)	Conventional (n=24)	p-value
Wound infection	1 (5.0%)	2 (8.3%)	0.68
Wound dehiscence	0	0	—
Postoperative bleeding	1 (5.0%)	1 (4.2%)	Not reported
Oedema/haematoma	2 (10.0%)	5 (20.8%)	0.40
Staple retention	1 (5.0%)	Not applicable	—
Cosmetic satisfaction	20 (100%)	18 (75.0%)	Not reported
Mean healing time	8.6 ± 1.58 days	13.29 ± 1.35 days	0.08

Wound infection and oedema/haematoma were numerically less frequent in the stapler group, although the reported differences were not statistically significant. One patient in the stapler group experienced staple retention. All patients in the stapler group reported cosmetic satisfaction compared with 75% in the conventional group. The

difference in healing time did not reach statistical significance.

Discussion

The present prospective comparative study evaluated stapler and conventional circumcision in 44 patients. The principal findings were a significantly shorter operative time, lower

intraoperative blood loss, and lower postoperative pain scores with stapler circumcision. These findings are clinically relevant in day-care surgery, where efficient operating-room utilization, rapid recovery, and patient comfort are important considerations [5].

The average surgical time was 9.1 minutes for stapler circumcisions compared to 26.12 minutes for conventional circumcisions. This difference can be explained by the simultaneous resection and suturing mechanism of the circular device. Conventional circumcision requires several sequential steps, including excision, identification and control of bleeding points, and suturing. In contrast, the stapler provides standardized circumferential wound approximation in a single application. Similar reductions in operative time have been reported in comparative studies of circumcision devices. However, operative time may also be influenced by surgeon experience, patient anatomy, anesthesia preparation, and training time associated with device placement [6, 7].

Intraoperative blood loss was 3.1 ml in the stapler group and 13.16 ml in the conventional group.

The reduced bleeding observed with staple circumcision may be due to simultaneous compression and suturing of the wound edges, limiting the need for ligation of individual vessels or extensive electrocautery. Reducing tissue handling and standardizing compressions also helps reduce blood loss.

However, absolute blood loss was low in both groups, and the clinical significance of this difference must be interpreted in terms of patient safety, cost, and availability of the procedure [8].

Postoperative pain was significantly reduced at 24 hours, 72 hours, and 5 days after stapled circumcision. The lower pain scores may be due to reduced tissue manipulation, avoidance of multiple sutures, reduced use of cautery, and uniform approximation of wound edges. Pain declined over time in both groups, indicating expected postoperative recovery. Although the difference was statistically significant, future studies should also record analgesic consumption, time to return to routine activities, and patient-reported functional recovery [9].

Although the incidence of wound infection and edema/hematoma was numerically lower in the stapler group, the difference was not statistically significant. Small sample size and low incidence reduced our power to detect differences in rare complications. No wound dehiscence was reported in either group.

Staple retention was observed in one patient, highlighting specific device-related issues that

should be discussed during informed consent. Other potential complications of device-assisted circumcision include delayed separation of the silicone ring, premature dislodgement of the ring, device malfunction, glans injury, and poor cosmetic results, although these were not reported in the present series [10].

Aesthetic satisfaction was reported by all patients in the stapler group and by 75% of patients in the conventional group. The uniform, round wound edge and consistent staple placement may explain the greater satisfaction observed with the device. However, patients reported satisfaction with cosmetic products, and this study did not use a validated cosmetic rating scale or independent blinded evaluation. Therefore, this conclusion should be considered exploratory rather than definitive. The mean healing time was shorter in the stapler group at 8.6 days compared to 13.29 days in the conventional group, with a reported p-value of 0.08. This indicates that the observed difference does not reach a predetermined threshold of statistical significance [11].

The result may reflect limited sample size, variability in wound healing, or differences in follow-up assessment. Larger studies should objectively determine healing and record the exact date of epithelialization or ring separation. Traditional circumcision still has important advantages, including wide applicability, lack of reliance on specialized equipment, reduced costs for devices, and flexibility in adapting the method of circumcision. Stapler circumcision may not be appropriate in patients with xerotic balanitis obliterans, dense adhesions, inappropriate glans size, or active infection. Therefore, the stapler should be considered as an option for certain patients and not as a universal replacement for traditional surgery [12].

Limitations: This was a single-center study, which included only 44 patients and did not have clear documentation of randomization. Unequal group sizes may reflect clinical selection.

Confidence intervals, detailed analgesic use, surgeon experience, device cost, and patient-reported recovery time were not provided. The short recruitment period and absence of multicentre validation limit generalizability. Larger randomized or well-adjusted comparative studies with standardized cosmetic and quality-of-life measures are needed.

Conclusion

In this prospective comparative series, stapled circumcision was associated with significantly shorter operative time, less intraoperative blood loss, and reduced postoperative pain compared with traditional circumcision. Wound infection and

swelling/hematoma were numerically lower with stapled circumcision, whereas cosmetic satisfaction was higher; however, the small sample size limited the statistical interpretation of these results. Healing time was shorter in the stapler group but did not reach statistical significance. Conventional circumcision remains a versatile and dependable technique because it does not require specialized equipment and can be tailored to individual anatomy. Circumcision with a stapler may be considered in appropriately selected patients after consultation about device cost, size limitations, staple retention, and issues related to silicone rings.

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