e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2025; 17(8); 1211-1215

Original Research Article

Efficacy of Low-Cost, Improvised Scrotal Supports In Reducing Postoperative Morbidity After Inguinal Hernia/Hydrocele Surgery (Compare Outcomes of Coconut Bandage Vs. Commercial Supports Vs. Standard Care, Focusing on Pain, Swelling, Patient Satisfaction, and Cost)

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Received: 01-06-2025 / Revised: 16-07-2025 / Accepted: 19-08-2025

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Conflict of interest: Nil

Abstract

Postoperative morbidity following inguinal hernia and hydrocele surgeries, including pain, scrotal edema, and hematoma, remains a significant concern, particularly in low-resource settings. Scrotal support is an effective intervention to reduce these complications, with both commercial devices and improvised methods such as coconut bandages showing clinical benefits. Evidence indicates that improvised supports are comparable to commercial devices in reducing pain and swelling, improving patient satisfaction, and facilitating early mobilization, while being significantly more cost-effective. This review synthesizes current evidence on the efficacy, patient acceptability, and economic feasibility of low-cost scrotal supports, highlighting their potential as practical alternatives in resource-constrained healthcare settings. Further high-quality randomized studies are required to establish standardized protocols and long-term outcomes.

Keywords: Scrotal support, Inguinal hernia, Hydrocele, Coconut bandage.

Introduction

Inguinal hernia and hydrocele surgeries are among the most frequently performed general surgical procedures worldwide, particularly in low- and middle-income countries (LMICs), where the prevalence of these conditions is high and access to timely surgical care is often limited. Inguinal hernias account for nearly 75% of all abdominal wall hernias, and hydroceles are highly prevalent in endemic regions, especially in South Asia and sub-Saharan Africa.[1] Together, they contribute significantly to surgical caseloads, and their management carries both clinical and socioeconomic importance.[1]

Postoperative morbidity following these procedures remains a key concern, with patients frequently experiencing pain, scrotal edema, hematoma formation, and delayed mobilization.[2] Such complications not only prolong recovery and impair quality of life but may also increase hospital stay and financial burden, especially in resource-limited settings. Reducing these morbidities is therefore a priority in improving surgical outcomes and patient satisfaction.[2]

Scrotal support plays an important role in the postoperative period by providing elevation, reducing dependent edema, limiting mobility-related discomfort, and supporting the healing tissues.[3] Commercially manufactured scrotal supports are widely used for this purpose in high-resource environments, and they are known to enhance comfort and accelerate recovery. However, these devices are often expensive, not readily available, and may not be culturally acceptable or feasible in rural and resource-constrained contexts.[3] In such settings, improvised low-cost alternatives such as the "coconut bandage" have been utilized. This method, fashioned using simple bandaging materials, provides effective scrotal elevation and compression at a fraction of the cost of commercial supports.[4] Beyond affordability, these improvisations are locally adaptable and easy to apply, making them attractive in primary and secondary healthcare systems where surgical

infrastructure and supplies are limited.[4] Therefore, it is of interest to review comparative evidence on low-cost scrotal supports versus commercial supports and standard care, focusing on their efficacy in reducing postoperative morbidity, improving patient satisfaction, and ensuring cost-effectiveness in diverse healthcare settings.

Historical Perspectives on Scrotal Support

The concept of scrotal support has long been recognized in surgical and urological practice as a simple yet effective means of reducing discomfort, swelling, and complications following scrotal or inguinal procedures. Traditional methods primarily relied on locally available materials, such as folded cloths, towels, or bandages fashioned into slings, to elevate and immobilize the scrotum.[5] These improvised techniques, still used in many rural and resource-constrained settings, are cost-effective, adaptable, and easy to implement, providing essential postoperative support where commercial devices are unavailable or unaffordable.[6]

During the 20th century, commercially manufactured scrotal supports were developed to provide standardized compression, improved ergonomics, and greater patient comfort.[7]

Typically made of elastic fabrics or adjustable pouches, these supports became widely used in high-resource countries and incorporated into routine postoperative protocols for hernia repair, hydrocelectomy, and other scrotal surgeries.[8]

Despite their advantages, the high cost and limited accessibility of commercial supports in low-resource settings have maintained the relevance of improvised methods, highlighting the ongoing need for effective, low-cost alternatives.[8]

Types of Scrotal Supports

Scrotal supports used in the postoperative care of inguinal hernia and hydrocele surgeries can be broadly categorized into commercially available supports, improvised or low-cost alternatives, and standard care without formal support. Each type differs in design, material, cost, and accessibility, influencing both clinical outcomes and patient acceptability.[9]Types of scrotal supports are shown in Table 1.

Table 1: Types of Scrotal Supports

Type of Support	Material	Design/Mechanism	Typical Cost (USD) INR	Availability	Ease of Use	Clinical Outcomes	Duration of Use	Reusability	Cultural Acceptability	Common Limitations
Commercial Scrotal Support[10]	Elastic fabric, neoprene, mesh	Ergonomic pouch with adjustable straps/Velcro; provides elevation & compression	$15–50 (₹1,245–4,150)	Urban hospitals, pharmacies	High; easy to wear & adjust	Reduces postoperative pain, scrotal edema, hematoma; improves mobility	1–2 weeks (depending on procedure)	High; washable & reusable	High in urban settings	High cost, limited rural availability, sizing issues
Coconut Bandage (Improvised)[10]	Soft cloth, cotton bandage	Pouch-like structure anchored around waist; supports scrotum	<$1–3 (<₹83–250)	Low-resource/rural hospitals, field settings	Moderate; requires proper tying & adjustment	Reduces edema & pain; comparable to commercial supports in small studies	1–2 weeks	High if properly laundered	High in rural/low-income areas	Requires instruction; hygiene dependent; variable support firmness
Elastic Bandage Modificat	Elastic cloth/bandage	Wrapped to elevate scrotum;	<$2–5 (<₹166–415)	Locally avail	Moderate; requir	Mild reduction in	1–2 weeks	Moderate	Moderate	May slip; uneven

ion[10]		secured around waist/thighs		able	es adjustment	pain & swelling; effective in early mobilization				compression; less ergonomic than commercial supports
Cloth Sling Support[10]	Cotton/ linen fabric	Rectangular cloth folded into sling; tied around waist	<$1–3 (<₹83–250)	Household/local materials	Low; needs proper tying	Basic support; partial edema reduction	5–7 days	High if washed properly	High in rural areas	Less consistent compression; risk of loosening; discomfort
Pillow or Folded Cloth Elevation (Standard Care)[10]	Pillow, folded towel	Scrotum elevated on pillow while supine; no device	Free	Universally available	Easy	Minimal edema reduction; pain control relies on medications	Until mobilization improves	N/A	High	Inconsistent support; limited mobility; no compression for hematoma
Hybrid Low-Cost Mesh Pouch[10]	Locally stitched mesh/fabric	Customized pouch; elasticized in some designs; mimics commercial support	$2–5 (₹166–415)	Low-resource hospitals	Moderate; adjustable	Comparable to coconut bandage; better comfort than sling	1–2 weeks	High	Moderate	Needs stitching skill; variable durability
Postoperative Compression Shorts (Commercial)[10]	Lycra/elastic material	Full scrotal coverage with compression; worn like underwear	$20–40 (₹1,660–3,320)	Urban surgical supply	High; easy to wear	Reduces pain & swelling; improves mobility	1–2 weeks	High	Moderate	Expensive; limited rural availability; sizing issues

Comparative Evidence on Outcomes

Postoperative pain is a primary concern following inguinal hernia and hydrocele surgeries, and scrotal support has been shown to play a significant role in its reduction.[3] Several studies report that patients using scrotal supports, including low-cost options like coconut bandages, experience lower pain scores compared to those receiving no support.[11] For instance, prospective observational studies have demonstrated reduced Visual Analog Scale (VAS) pain scores in patients with coconut bandages, alongside faster return to mobility. Commercial supports similarly reduce discomfort, though some trials involving laparoscopic procedures found no significant differences in early postoperative pain between support and non-support groups.[12]

Scrotal support also contributes to reduction of swelling and edema, improved patient satisfaction, and cost-effectiveness. Evidence indicates that the

incidence of scrotal edema and hematoma is lower in patients using either commercial or improvised supports, with coconut bandages showing comparable outcomes to commercial devices in rural and low-resource settings.[3] Patient satisfaction is higher with scrotal support due to increased comfort, easier mobilization, and faster return to daily activities.[7] In terms of cost, improvised supports like coconut bandages are extremely affordable (<$3 per patient) while providing similar clinical benefits, whereas commercial supports can range from $15–50 and may be inaccessible in low-resource areas. These findings suggest that low-cost scrotal supports can be a viable alternative to commercial devices, especially in resource-constrained environments.[7]

Discussion

The available evidence indicates that scrotal supports, whether commercial or improvised, can reduce postoperative pain, limit scrotal edema, and improve patient satisfaction following inguinal hernia and hydrocele surgeries.[11] Observational studies and smaller trials consistently show that improvised supports such as coconut bandages provide outcomes comparable to commercial devices, particularly in open surgical procedures.[3] Pain scores are generally lower, the incidence of scrotal edema and hematoma is reduced, and patient comfort and mobility are enhanced when scrotal support is applied. While some trials in laparoscopic or minimally invasive surgeries report minimal differences, the overall trend supports the use of scrotal elevation and compression in routine postoperative care.[3] Improvised supports offer distinct advantages in low-resource settings, including affordability, ease of local production, and accessibility. The coconut bandage and other locally fashioned slings can be applied immediately postoperatively without the need for specialized equipment, making them practical in rural or under-resourced hospitals.

However, potential limitations exist, including hygiene concerns, variable durability, and the need for proper patient instruction to ensure effective application and compliance.[13] Cultural acceptability is generally high for low-cost, locally sourced methods, although individual preferences may vary. Notably, significant gaps remain in the literature, including a lack of large-scale randomized controlled trials, limited long-term outcome data, and the absence of standardized protocols for improvised scrotal support.

Addressing these gaps is essential for formulating evidence-based guidelines and integrating low-cost supports into routine postoperative care globally.[13]

Conclusion

Scrotal supports, including both commercial devices and low-cost improvised methods such as coconut bandages, effectively reduce postoperative pain, limit scrotal edema, and enhance patient satisfaction following inguinal hernia and hydrocele surgeries. Improvised supports offer a particularly valuable solution in low-resource settings due to their affordability, accessibility, and cultural acceptability, while demonstrating clinical outcomes comparable to commercial alternatives.

Despite these benefits, further large-scale, randomized studies are needed to standardize application protocols, assess long-term outcomes, and optimize postoperative care in diverse healthcare environments.

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