Feasibility and outcome of tension-free Desarda repair for treatment of complicated inguinal hernia

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Background
The gold standard in managing strangulated hernia is early surgical intervention. The appropriate surgical technique for emergency inguinal hernia is less documented. Pure tissue repairs have an essential role in such cases. The aim of this study was to report the outcome of the Desarda technique for the treatment of complicated inguinal hernias.

Patients and methods
The present study included 52 patients who were recruited and operated on for emergency inguinal hernia and repaired by the Desarda technique. The mean operative time and hospital stay were reported together with intraoperative and postoperative complications. Return-to-normal activities and recurrence were also reported throughout the 18-month follow-up.

Results
The mean age of the eligible patients was 39.6±14.9 years. The mean operative time was 69.5±4.3 min, with a mean hospital stay of 3.7±1.9 days. Seroma and surgical site infection were the most reported complications and presented in six (11.5%) patients. The return to basal, home, and work activities was 1.8±1.31, 6.8 ±2.1, and 19.7±3.1 days, respectively. There was a statistically significant increase in recurrence throughout the follow-up time, where it was reported in four (7.7%) patients at 18-month follow-up, whereas only one patient (1.9%) reported recurrence after 6 and 12 months.

Conclusion
According to the current results, Desarda tension-free repair is an easy, feasible, reliable, applicable, and effective technique for the treatment of complicated inguinal hernia, with acceptable rates of postoperative complications and a low recurrence rate.

Keywords:
complicated hernia, Desarda technique, tension free

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Introduction

Complicated inguinal hernias require emergency surgery, which is usually associated with a significant rate of postoperative complications and poor outcomes. Emergent surgery for such a condition carries a high risk of postoperative morbidities and unfavorable outcomes [1]. Up till now, strangulated inguinal hernias remain a great challenge, as they are sometimes difficult to diagnose by physical examination, and subsequent delay in urgent surgical intervention may occur [2,3]. Strangulated hernias cause bacterial translocation and intestinal necrosis and perforation with consequences of a higher surgical site of infection (SSI) rate and even incidence of recurrence. The gold standard in managing strangulated hernia is early surgical intervention, as delayed diagnosis has many morbidities, including bowel resection, increased complications, prolonged recovery, prolonged hospital stay, and overall cost. There are some reports describing a higher rate of infection with foreign material implantations like prosthetic mesh [4]

In 2017, the World Society of Emergency Surgery updated the recommended guidelines for the treatment of strangulated hernia in which the main determinant was the class of surgical wounds. For stable patients presented with strangulation with gangrene or spillage of the intestinal contamination during surgery (wound class III) or those with peritonitis (wound class IV), different repair methods were described. The primary repair can be used for small defects. Biological mesh or polyglactin mesh repair may be used for repair. In cases of bacterial peritonitis, the reported incidence of infection is 21% [5,6]. Some authors recommended the use of absorbable prosthetic materials. However,

the outcome was not satisfactory, as there was a great incidence of recurrence. These meshes induce an inflammatory reaction that, through a hydrolytic reaction, digests and removes the implanted prosthetic material completely. Biological mesh prosthetics are mostly used in infected fields involving large, complex abdominal wall hernia repairs, but the availability and cost are still the main obstacle [7,8].

Since described in 2001, the Desarda technique, which is a nonmesh technique in which an external oblique aponeurosis (EOA) is used for the repair of the posterior wall of the inguinal canal, has gained popularity owing to its low cost and effectiveness [9,10].

Surgical technique for emergency inguinal hernia surgery remains an important area less documented, and as the use of mesh in an emergency context remains controversial, pure tissue repairs have an essential role in the management of incarcerated or strangulated inguinal hernia [11]. This has motivated the authors to conduct this study to evaluate the efficacy and outcome of the Desarda technique for emergency inguinal hernia repair.

Patients and methods

Study design and patients

The current retrospective observational study was conducted after the approval of Ethical and Research Committees, Benha University, following ethical consideration of the World Medical Association Declaration of Helsinki.

The data of 52 eligible patients who were recruited and operated on for emergency inguinal hernia repair were registered. These patients presented to the Emergency Surgery Department at both Benha University Hospital and Benha Teaching Hospital throughout the period from June 2020 till December 2022. The study included 52 male patients who presented with complicated inguinal hernia either irreducibility, obstruction, or even strangulation, where the surgical field was potentially contaminated and were eligible for urgent surgery and tissue repair of the hernia. The main inclusion criterion to perform Desarda repair was the intraoperative assessment of the EOA where patients with tiny or rudimentary aponeurosis were excluded, as they were not eligible for Desarda repair. Moreover, patients with very wide external ring were also excluded as there were distortions in the EOA. Patients with an American Society of Anesthesiologists score more than 3 and patients who did not complete at least 18 months of follow-up were excluded as well. A written informed consent was obtained from all patients included in the study.

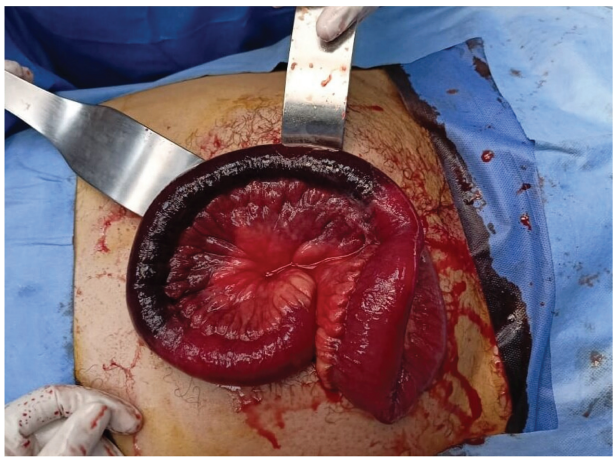
After history taking and physical examination and investigations, the procedure was done under either general or spinal anesthesia.

Procedure

The established protocol followed in all eligible patients included intravenous antibiotics with induction of anesthesia and insertion of urinary catheter.

While the patient in supine position, a planned inguinal incision was done including skin, subcutaneous layer, and incision in the EOA was done starting from the upper border of the external ring and extending laterally. The inguinal canal was exposed, and the sac was dissected from the spermatic cord, and evacuation of the toxic fluid was done and the contents were managed accordingly. Strangulated omentum was excised, gangrenous small bowel (Fig. 1) resection anastomosis was done, and viable bowels were reduced to the abdomen. In cases where gangrenous cecum or sigmoid were found lower, as midline incision and colonic resection were done. After dealing with the contents, proper herniotomy was done together with the narrowing of the internal ring. Desarda repair was done following the original steps described by Desarda in 2001 [9]. The edge of the upper EOA flap was sutured in the reflected part of the inguinal ligament forming the first suture line (Fig. 2) and then a longitudinal incisional 1 inch above the first suture line creating an EOA flap was done (Fig. 3),

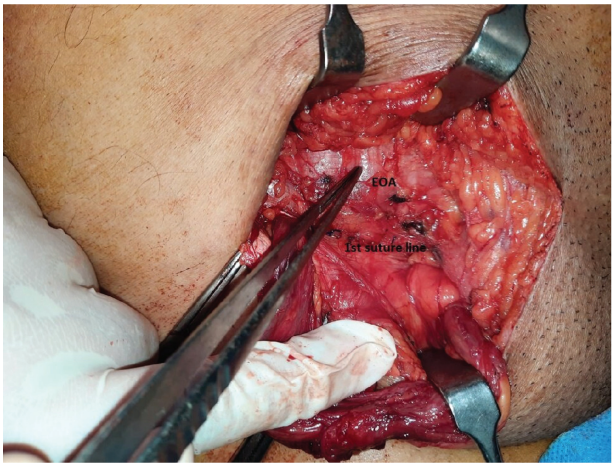
Figure 1



Strangulated inguinal hernia with gangrenous bowel.

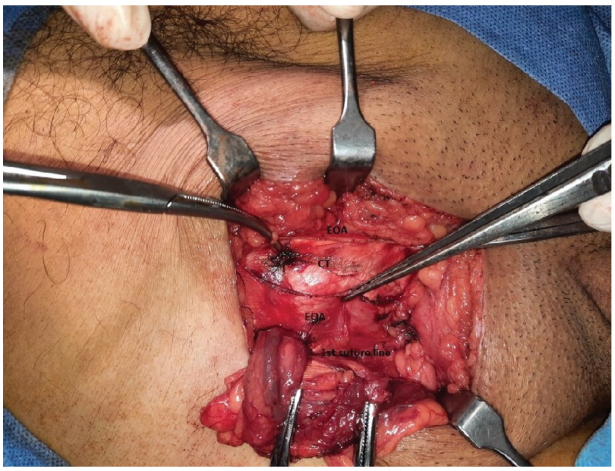
which was left in the floor of the inguinal canal that was sutured in the conjoint ligament forming the second suture line (Fig. 4). The cord was placed over the flap and then the EOA was sutured above the cord. Closure over a subcutaneous drain was done.

Figure 2



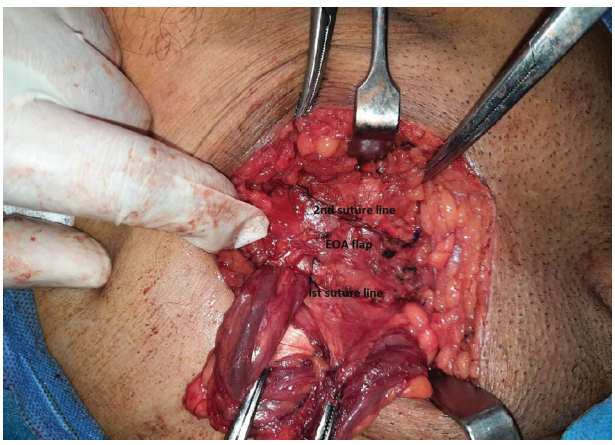
Suture the inguinal ligament to the external oblique aponeurosis.

Figure 3



Creation of external oblique aponeurosis flap.

Figure 4



Suturing the external oblique aponeurosis flap to the conjoint tendon.

Evaluation and follow-up

For both groups, the operative time, intraoperative complications, postoperative complications, postoperative pain, thigh numbness, hospital stay, and return-to-normal activities were recorded. Follow-up was designed for 1 month for early postoperative complications and for at least 18 months for long-term complications, especially recurrence.

Outcomes

The primary outcome was the successful repair of a complicated inguinal hernia with minimal short-term complications.

The secondary outcome was a decrease in hospital admission days and absence from work together with decreased incidence of recurrence.

Statistical analysis

The sample size was calculated depending on the incidence of postoperative complications, which is the primary outcome of this study, and 18-month follow-up for recurrence with an incidence of 10% loss in follow-up. A sample size of 52 was considered with a power of 80%, P value of 0.05, and an effect size of 0.7 using G*power 3.1 software (Universities, Dusseldorf, Germany).

SPSS, version 25 (IBM Corp., Armonk, New York, USA) was used for statistical analysis. Student's t-test was used for quantitative parameters that were described using mean and SD. The χ^2-test was used for qualitative parameters that were described as the frequency with percent. P values of less than 0.05 were considered significant.

Results

The current study included 52 male patients with a mean age of 39.6±14.9 years, with an American Society of Anesthesiologists score less than or equal to 3 (Table 1). Other sociodemographic data and co-morbidities are demonstrated in Table 1 Among eligible patients, 44.2% presented with a right side hernia, whereas 55.8% presented with a left-sided hernia. The mean operative time was 69.5±4.3 min, and resection anastomosis was done in 23% of patients. The mean hospital stay was 3.7±1.9 days (Table 2). Early postoperative complications were reported, where seroma and SSI was the most common and

presented in six (11.5%). Other early complications are shown in Table 3. Early postoperative pain was assessed and reported via the visual analog scale (VAS) score. After the VAS results were transformed into a descriptive pain scale, 43 (82.7) patients reported mild pain (VAS 1–29), whereas nine patients (17.3%) reported moderate pain (VAS 30–55). No severe pain (VAS >55) was observed and no chronic pain was reported after 3 months. The return to basal, home, and work activities was 1.8 ±1.31, 6.8±2.1, and 19.7±3.1 days, respectively. There was a statistically significant increase in recurrence throughout the time of follow-up, where it was reported in four (7.7%) patients at 18-month follow-up, whereas only one patient (1.9%) reported recurrence after 6 and 12 months. There was no statistically significant difference during the follow-up of loss or change in sensation, abdominal wall stiffness, or foreign body sensation at 6, 12, and 18 months (Table 4).

Table 1 Baseline characteristics, including demographics, co-morbidities, and occupation

Characteristic	*n*=52 [*n* (%)]
Age (mean±SD)	39.6±14.9
ASA score	1 (1–3)
HTN	5 (9.6)
DM	8 (15.4)
IHD	6 (11.5)
Smoking	13 (25)
BMI	31.6±4.6 kg/m^2
Employment	
Student	1 (1.9)
Nonphysical	16 (30.7)
Light physical	15 (28.8)
Heavy physical	12 (23)
Retired	8 (15.4)

ASA, American Society of Anesthesiologists; DM, diabetes mellitus; HTN, hypertension; IHD, ischemic heart disease.

Table 2 Characteristic of operated hernias

Characteristic	*N*=52 [*n* (%)]
Right side operation	23 (44.2)
Left side operation	29 (55.8)
Duration of hernia (months)	48 (7–84)
Procedure done	
Resection anastomosis of small bowel	12 (23)
Right hemicolectomy	1 (1.9)
Sigmoidectomy (Hartmann's)	1 (1.9)
Viable bowel	38 (73.1)
Operative time (mean±SD)	69.5±4.3 min
Range	59–83 min
Hospital stay (mean±SD)	3.7±1.9 days
Range	2–8 days

Table 3 Short-term follow-up

Parameter	*N*=52 [*n* (%)]
Testicular edema	
7 days	4 (7.7)
30 days	2 (3.84)
Inguinal hematoma	4 (7.7)
Ecchymosis	5 (9.6)
Seroma	
7 days	6 (11.5)
30 days	0
Surgical site infection	6 (11.5)
Return to basic activity	
Mean±SD	1.8±1.31
Range	(1–7) days
Return to home activity	
Mean±SD	6.8±2.1
Range	(2–13) days
Return to work activity	19.7±3.1
Mean±SD	
Range	(15–38) days

Discussion

As a global health problem, strangulated inguinal hernia can be a life-threatening condition because of the incidence of peritonitis and sepsis, and this makes emergent surgery for such a condition of particular importance [12]. Some studies reported more than 30% of inguinal hernias are operated on in an emergency setting. The best surgical technique should be the one considering scientific evidence and cost-effectiveness [13]. According to the World Society of Emergency Surgery guidelines, emergency repair of complicated inguinal hernia mesh can be done in clean-contaminated wounds with a wide range of safety, but there is weak evidence about the safety of the use of prosthesis in contaminated wounds besides the evidence describing chronic pain in mesh repair of inguinal hernia, taking also into consideration the huge cost of biological mesh [3,4]. However, the evidence is still limited, and the choice of a particular approach seems to be still case based and depends mainly on the experience of the surgeon in charge [11]. Besides, the aforementioned causes made many authors focus mainly on tissue repair for complicated inguinal hernia, especially in developing

Table 4 Long-term follow-up

Long-term complication	6-month follow-up [*n* (%)]	12-month follow-up [*n* (%)]	18-month follow-up [*n* (%)]	*P* value
Recurrence	1 (1.9)	1 (1.9)	4 (7.7)	0.001*
Loss or change in sensation	10 (19.23)	9 (17.3)	9 (17.3)	0.792
Abdominal wall stiffness	8 (15.4)	7 (13.46)	6 (11.5)	0.569
FB sensation	7 (13.46)	7 (13.46)	6 (11.5)	0.821

*Statistically significant. FB, Foreign body.

countries. Desarda technique is a great example because it is a tension-free and mesh-free repair [10]. Besides, three recent meta-analyses have not found any difference between Desarda and Lichtenstein in terms of short effectiveness for uncomplicated inguinal hernia [14,15]. This great debate made the recent International Guidelines for groin hernia management raise a red flag for the urgent need for more research about emergency treatment of groin hernia [11]. Low-evidence studies have been conducted to assess the efficacy of the Desarda technique for emergency surgery. Only two randomized controlled studies comparing Desarda and other tissue repairs are present [16,17]. In the current study, the mean operative time was 69.5 min. This was slightly less than what was reported by Ndong *et al.* [13]. In their systemic review, they reported a mean operative time of 74.4 min. This may be assumed to be due to the viable bowel found in most cases of the current study (73.1%). The overall postoperative complication rates reported in the current study were 12 (23%) patients, and this is much less than what was reported by Rodrigues-Gonçalves *et al.* [18], who reported an overall postoperative complications rate of 48.1%. This appears to be owing to inclusion of more complex procedures like open preperitoneal repair in their study. The main early postoperative complication in the present study was the SSI (11.5%). This incidence was much less than that compared with Bhangu *et al.* [19], who reported a prevalence of SSI of 16.56% as they included many cases with gangrenous bowel loops and more wound contamination. The reported postoperative pain in this study was comparable to many studies with very small nonsignificant variation owing to different duration of follow-up [20,21]. One important point in the current study was no recorded chronic postoperative pain, and this may be assumed to be owing to the pure tissue repair without mesh implantation, which may induce inflammatory changes causing chronic pain lasting more than 6 months. Recurrence is an important component in the evaluation of the efficacy of a hernia surgical treatment and has been for a long time the only one considered criterion [22]. Desarda technique is particularly associated with a low risk of recurrence even if it is a pure tissue repair. This is because this technique strengthens the main anatomical element, preventing hernia formation [23]. The pooled rate of recurrence was relatively low in the literature at 2.10% in elective cases [13]. The reported incidence of recurrence in the current study was 7.7%, and this is slightly higher than elective cases but when considering the emergency context. Emergency admission is associated with a higher risk of recurrence even for mesh repairs [24,25]. However, the reported rate of recurrence in the current study is still within the same range of many studies [18,26–28], which have reported recurrence rates after emergency groin hernia repair of up to 10%. One of the cornerstone points to evaluate the outcome of hernia repair is the time to return-to-normal activities [10]. In the current study, the return to basal, home, and work activities was 1.8 ±1.31, 6.8±2.1, and 19.7±3.1 days, respectively, and this matched the outcomes reported by the international hernia guidelines [11].

Conclusion

According to the current results, Desarda tension-free repair is an easy, feasible, reliable, applicable, and effective technique for the treatment of complicated inguinal hernia, with acceptable rate of postoperative complications and a low recurrence rate.

Study limitations

Missed patients in follow-up and lack of well-designed studies to compare with were the study limitations.

Recommendations

Desarda technique is recommended for the treatment of complicated hernia when the EOA is well developed and not tiny or distorted.

Authors' contribution

E.M.A. contributed toward concept and design of the study, conduction of procedure, analysis of data, and drafting of the manuscript. H.S.A. contributed toward study design, conduction of procedure, and supervision of cognitive and behavioral assessments. A.E.S. contributed toward collection of the data and conduction of the procedure, and well as drafting and final revision of the manuscript.

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Conflicts of interest

There are no conflicts of interest.

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