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Stoppa's Repair in Bilateral Inguinal Hernia

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Abstract

Introduction: Inguinal hernia present a significant burden globally, necessitating effective surgical repair. All hernias were repaired anatomically before the mesh era started. Results of the operations done were also reasonably satisfactory, But the large, complex and bilateral inguinal hernias were a problem for anatomical repairs due to more complications and recurrences. This review aims to provide effectiveness of rives-stppa's repair in bilateral complex and recurrent inguinal hernia in terms of outcomes like recurrence rate , days of hospital stay , patient related factors like defect size, secondary complications , mesh related complications etc.

Materials and Methods: A prospective observational study was performed in the department of general surgery, medical college, baroda. In period between Oct. 2023 to Aug. 2024, a total of 50 patients were enrolled for which Stoppa's repair done for bilateral inguinal hernia.

Results: The mean age of patients in study was 57.20 ± 12.95 years. Out of 50 patients, 8% of SSI was identified among our study population. The mean time taken for stoppa's repair was 66.90 ±11.29 Min. Mean Day of Hospital stay was 2.38 ± 1.12 Day. post-operative pain assessed by Visual analogue score (VAS) pain score was significantly decreased at day-7 p value is (p=<0.0001). In our study 16% had seroma, 18% hematoma, 20% had

pain (testicular) and 14% had swelling type of complications with zero recurrence.

Conclusion: Preperitoneal approach used in stoppa's repair is considered suitable method which work on pascal's principle. It is invasive compared to other open techniques, leading to reduced postoperative pain and quicker recovery. Suitable for complex hernias: large, complicated or recurrent inguinal hernia.

Keywords: Bilateral inguinal hernia, stoppa's repair, recurrent hernia.

Introduction

Inguinal hernia presents a significant burden globally, necessitating effective surgical repair. These hernias occur when abdominal organs, such as the intestines or fatty tissue, protrude through weakened or torn areas in the inguinal canal - a crucial passage in the lower abdomen[1]. The causes of inguinal hernias vary, including congenital predisposition, age-related weakening of abdominal tissues, heavy lifting, chronic coughing, or obesity. They can manifest unilaterally, affecting one side of the groin or bilaterally, involving both sides. Moreover, their incidence tends to rise with age and is notably more common in males. Left untreated, inguinal hernias can lead to severe complications such as bowel obstruction or strangulation, which necessitate emergency surgical intervention to prevent lifethreatening consequences[5].

The hernia surgery has gone through a major evolution from the days of truss & castration to the present day of laparoscopic extra peritoneal surgery. The main reasons for intervention have remained the same continuous growth of inguinal or scrotal swelling, risk of incarceration & bad results of conservative methods[1]. From Bassini's heralding of the modern era to today's mesh-based open and laparoscopic repairs, this history parallels closely the evolution in anatomical understanding, development of the techniques of general surgery & progress in technology. However the issue remains; whether the wide array of surgical procedures can or should be whittled down to a few "standard" operations that are safe, effective, and cost efficient.

Effective management of inguinal hernia hinges upon selecting appropriate hernia repair techniques. The choice of surgical approach plays a pivotal role in determining patient outcomes, including factors such as postoperative pain levels, recovery time, and hernia recurrence. We have various options including open repair techniques like traditional tension free mesh repair, Rives-stoppa technique, and minimally invasive approaches such as laparoscopic hernia repair.

As Complex and recurrent inguinal hernia constitute an important public health problem and often poses surgical dilemma even for more skilled surgeons[4].Stoppa and colleagues used the posterior approach to implant an impermeable barrier around the entire peritoneal bag, demonstrating that permanent repair of groin hernias does not require closure of the abdominal wall defect per se. The Stoppa-Rives giant prosthetic repair of the visceral sac (GPRVS) is also an important tension-free technique done through an open posterior approach. GPRVS is usually performed in patients fit for general anaesthesia, in recurrent hernias (repaired prior by anterior repairs), or large and/or bilateral inguinoscrotal hernias. It requires a wide dissection of subfascial preperitoneal space. The rationale is based on elegant surgical and anatomical prosthetic placement that occludes myopectineal ostium of Fruchard for inguinal and tenseless mesh placement for ventral hernia, especially infra-umbilical region.

The objective of this review is to conduct observasional analysis of surgical technique for managing bilateral inguinal hernias by Rives-Stoppa repair. By meticulously examining the advantages, disadvantages, outcomes, and factors influencing technique selection, this review aims to provide valuable insights to healthcare professionals and surgeons.

Aims and objectives

To assess the effectiveness of stoppa's repair in terms of outcomes like

Primary outcome

Recurrence rate

Secondary outcome

1. Operative time
2. Defect size
3. Hospital stay
4. Complications

(a) General-Infection

- Hematoma
- Seroma
- Pain

(b) Mesh related-infection, fistula, sinus.

Inclusion criteria

➢ 18 to 80 years age

➢ Site of defect: B/L inguinal hernia

➢ BMI: < 35

➢ Bilateral uncomplicated hernia

➢ Bilateral inguinal hernia.

Exclusion criteria

➢ Less than 18 years and more than 80 years

➢ Site: other than inguinal hernia

➢ BMI: > 35

➢ Complicated hernia

➢ Unilateral inguinal hernia

➢ Those requiring emergency surgery

➢ Immunocompromised patients

Sample size: Total sample size was taken 50.

Study setting: Department of General Surgery, Government Medical College and Sir Sayajirao General Hospital, Vadodara. Patients of bilateral inguinal hernia underwent Rives –stoppa's repair after written consent for the same. Study starts from approval by Institute Ethical Committee in Oct. 2023 to August 2024

Statistical analysis

Methodology

Patients visiting outpatient department or admitted in ward from completion of Institutional Ethics Committee review in July 2024 to August 2024 matching the above inclusion and exclusion criteria were explained about the study and on willingness were enrolled after written informed consent was obtained.

- We recorded all the observation in operative procedure during all steps for uniformity of study.
- A written informed consent was obtained.
- History data and clinical examination findings collected on printed proforma.
- Preoperative Investigations:

➢ Routine blood investigations including complete blood count, Renal function tests, Liver function tests, serum electrolytes and random blood sugar.

➢ USG prostate with PRV

➢ USG bilateral inguinoscrotal region.

Nil by mouth according to anesthetist advice. The procedure was done under general/spinal anesthesia. Prophylactic antibiotic (inj ceftriaxone 1gm IV) was given at the time of induction of anesthesia. In all 50 selected cases Rives – stoppa's procedure was performed. All intraoperative events were noted.

The Rives-Stoppa repair technique entails dissecting a retro muscular plane between the muscle bellies and the posterior aponeurosis of the abdominal rectus muscles. This dissection allows for a tension-free closure of the musculoaponeurotic flap in the midline, effectively reconstructing the anatomy of the abdominal wall[7].

The surgeon & nurse stand on one side & the assistant on the other. The lower abdominal wall is incised in the mid line across a length of 8-10cm (Figure 1.). A pfannestiel incision of similar length may also be used for the same purpose. The linea alba is cut along the entire length of the skin incision & rectus muscle is retracted laterally. The pre peritoneal & prevesical cleavage is begun inferiorly & medially in the space of Retzius and progresses laterally under the rectus muscle on either side opposite the surgeon & posterior to the inferior epigastric vessels, continuing down ward anterior to bladder, to the prostatic fossa & behind the ilio pubic ramus in the space of Bogros.

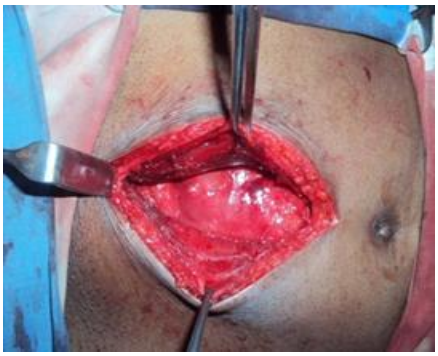


Figure 1:

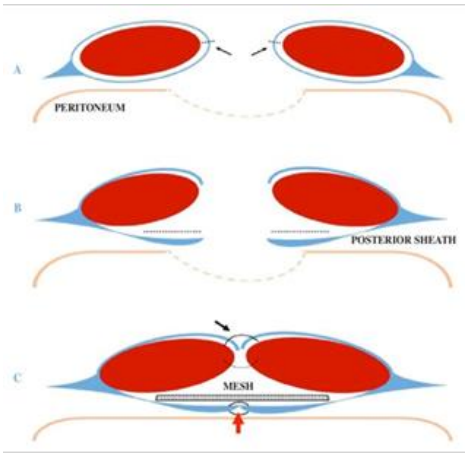


Figure 2: Basic principles of Rives-Stoppa retromuscular technique: A) Longitudinal incision on the posterior sheath of the rectus muscle. B) Dissection of a retromuscular plane between the muscle belly and the posterior sheath. C) Closure of the posterior sheath in the midline (red arrow) with mesh placement on this plane and closure of the anterior musculo-aponeurotic flap (black arrow).

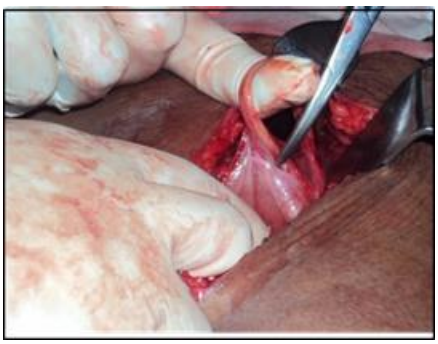


Figure 3:

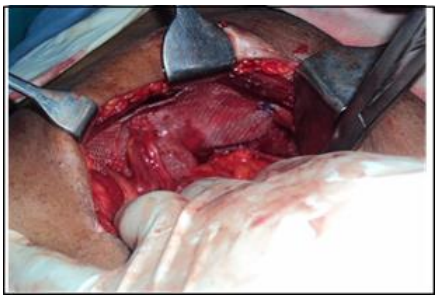


Figure 4:

The procedural steps typically involve opening the hernia sac(Figure 3), performing adhesiolysis, making a longitudinal incision on the posterior sheath of the rectus

muscle, dividing the retro muscular space, closing the posterior sheath, placing mesh in the retro muscular space, and finally achieving tension-free closure of the anterior musculoaponeurotic flap to reconstruct the midline[7]. In this way the mesh envelopes the peritoneum on the side opposite to the surgeon. The mesh was fixed to the cooper's ligament with a single stitch with prolene no 1. (Figure 4.)

Complications during operation were noted if any. The total duration of operation – from incision over the abdomen to closure of incision was also noted. Post operatively the patients were kept nil by mouth for 6 hours and advised complete bed rest till the effect of anesthesia completely worn out. Prophylactic oral antibiotics given for duration of 5 to 7 days, of which parenteral antibiotics given for the first 24 hours, Injection Paracetamol 500 mg iv 8 hourly will be given to all patients for 24 to 48 hours. Patients were advised and encouraged to ambulate and start their activities of daily life as early as possible. Patients were observed for any complications like pain, seroma, hematoma, infection etc. If clinically suspected infection present then wound and/ or blood culture sensitivity sample will be send and definitive antibiotic started accordingly.

Patient were discharged once free of complications and once they resumed their activities of daily life. Patients were discharged on post-op day 3. At discharge they were advised to come for follow up on 7th, 14th and 21th post op day and stitch removal done accordingly after assessment. Then they were asked to follow up on 1st and 6th month post-surgery to check for recurrence.

Operative time: Time taken from placing the incision over lower abdomen to closure to be calculated in min.

Pain Assessment: The pain assessment was done using the Visual Analogue Scale, to assess the severity of pain at 6 hours and 12 hours after surgery (which was under injectable analgesic cover) and on the first, third and seventh postoperative day.

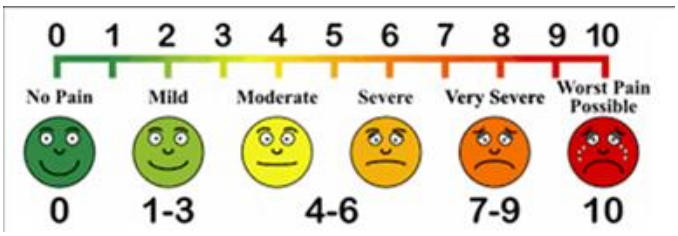


Figure 5: Visual analogue scale

The local sites were also examined for seroma/Surgical Site Infections prior to discharge and on follow-up.

Seroma formation: A seroma is a pocket of clear serous fluid that develops at the site of surgical intervention. Patient was to be examined on 1st and 5th post-op day and development of a new, abnormal swelling at site of incision will be followed with Ultrasound of local site to look for seroma formation.

Surgical site infection: Of three types of Surgical Site Infections, (superficial incisional, deep incisional, and organ/space infection) the superficial incisional SSI will be studied – characterized by – local signs of inflammation such as redness, pain, heat, swelling or drainage of pus on 5th and 10th post-operative day.

Recurrence: Recurrence of the hernia will be studied on 1st and 6th month of follow up.

Results and analysis

A prospective observational study with 50 patients undergoing Stoppa's repair for biilateral inguinal hernia who were admitted to the general surgical ward, Government Medical College and Sir Sayajirao General Hospital, Vadodara, after fitting the inclusion criteria and after having taken consent for the same, was undertaken to study the efficacy of stoppa's repair based on intraoperative complications, total duration of

operation, postoperative pain, post-operative complications and recurrence rate.

Table 1: Overall Mean Age

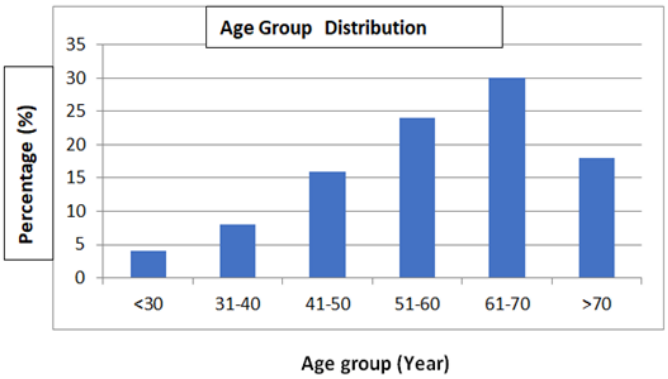
	n	Minimum	Maximum	Mean	Std. Deviation
AGE	25	23	80	57.20	12.950

Above table shows overall mean age was 57.20 ± 12.95 years.

Table 2: Age Group Distribution

Age group	Frequency	Percentage (%)
< 30	2	4.0
31-40	4	8.0
41-50	8	16.0
51-60	12	24.0
61-70	15	30.0
>70	9	18.0
Total	50	100.0

Chart 1: Age Group Distribution



Above table and figure shows age group distribution of patients, categorised into six groups as followings: ≤ 30 years (4%), 31-40 years (8%), 41-50 years (16%), 51-60 years (24%), 61-70 years (30%) and >70 years (18%). Most common age group was 61-70 years whereas least common age group was ≤ 30 years.

Table 3: Final Diagnosis

Final Diagnosis	Frequency	Percent
Direct	29	58.0
Indirect	21	42.0
Total	50	100.00

Above table and chart shows final diagnosis of patients. Out of 50 patients, 58% were direct diagnosis whereas 42% were indirect diagnosis.

Chart 2: Final Diagnosis

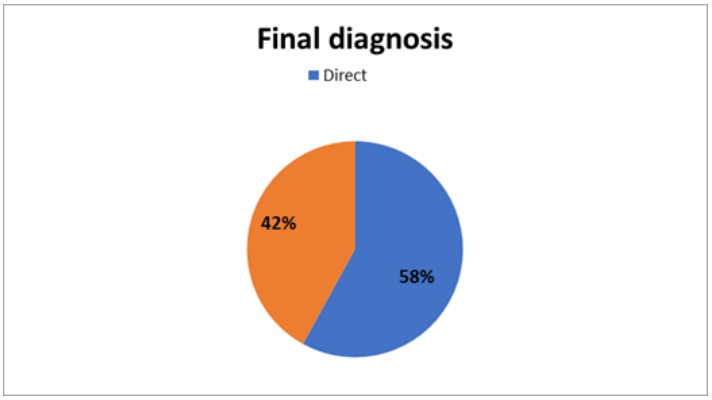
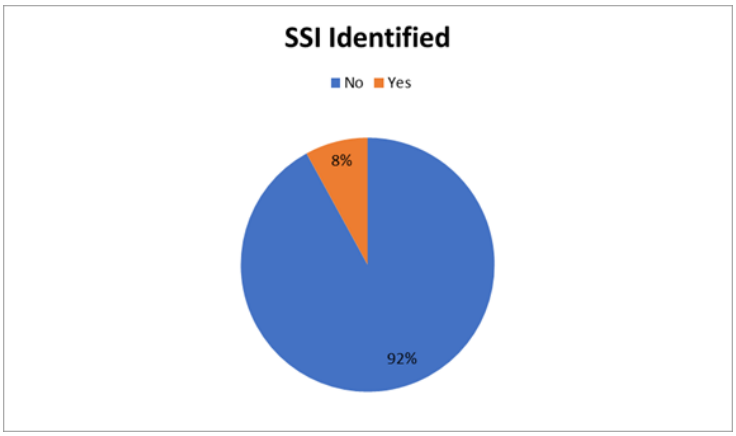


Table 4: Surgical Site Infection (SSI)

SSI Identified	Frequency	Percent
No	46	92.0
Yes	4	8.0
Total	50	100.0

Chart 3: Surgical Site Infection (SSI)



Above table and shows surgical site infection, Out of 50 patients, 8% of SSI was identified among our study population.

Table 5: Complications

Complication		Frequency	Percent
Seroma		8	16
Hematoma		9	18
Recurrence Of hernia(Clinically)		0	0
Recurrence Of hernia on (Ultrasound)		0	0
Infection		0	0
Mesh	sinus	0	0
	fistula	0	0
Testicular Complication	pain	10	20
	swelling	7	14

Above table shows complication 16% had seroma, 18% hematoma, 20% had pain (testicular) and 14% had swelling type of complication observed among study population.

Table 6: Hospital Stay

	Sample size	Minimum days	Maximum days	Mean	SD
Days of hospital stay	50	1	5	2.38	1.12

Above table shows Mean Day of Hospital Stay. overall mean operative time was 2.38 ± 1.12 Day.

Table 7: Operative Time

	Sample size	Minimum	Maximum	Mean	SD
Operative time	50	60	90	66.90	11.289

Above table shows operative time of in which the mean time in our study is 66.90 ±11.29 hours.

Table 8: Post Operative Pain Comparsion By Visual Analogue Score (Vas)

	Mean	SD
6 Hrs	1.82	1.240
12 Hrs	1.48	0.886
Post-operative day 1	1.98	1.059
Post-operative day 3	1.00	0.000
Post-operative day 7	0.00	0.000
	<0.0001	<0.0001

Above table shows post-operative pain, Visual analogue score (VAS) pain score was significantly decreased at day7 .p value is (p=<0.0001)

Table 9: Complications

Complications	Frequency	Percent
No	28	56
Yes	22	44

Above table shows complication rate, which was 44%.

Discussion

In the era of minimal access surgery (MAS) gaining popularity to replace traditional open access approaches, there is still a sub-group of complex inguinal hernias presenting for the first time, which might best be managed by open preperitoneal access because of various technical challenges in MAS or anterior open approaches. Dense intra-sac adhesions would impede reduction during MAS whereas, the relatively smaller mesh would be insufficient to place in an inguinal canal to re-enforce the lower abdominal wall and myopectineal region by open anterior approach, especially for giant or complex inguinal hernias. Stoppa offers good results with a minimum chance of recurrence[10].

Inguinal hernia and its management have continued to remain the throne to the surgeons. Hernia repair and its failure keep troubling the patient and humiliating the surgeon.

Advantages of pre-peritoneal prolene mesh hernioplasty:

- Permits inspection of all potential abdominal hernia sites.
- Tensionless and suture less repair in its true sense.
- This space is a virgin space typically intact during repair of recurrent hernias which greatly facilitates the procedure.
- Reduces the risk of nerve injury, neuralgia, orchitis, testicular atrophy and chronic pain as observed in the pain scale distribution.

The procedure uses a midline incision and avoids reopening through scarred anatomy in cases of recurrent inguinal hernias and also provides convenient access for repair in non-recurrent hernias like giant inguinal scrotal hernias, large bilateral inguinal hernias, wide deep inguinal ring more than 8 cm in diameter, medium to large obstructed/strangulated inguinal hernias and in unilateral scrotal abdomen. It exploits Pascal's principle to hold the mesh without tension (Figure 6).

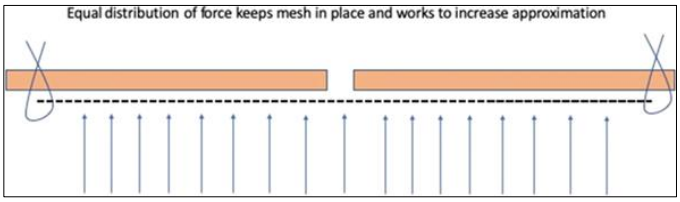


Figure 6:

The following study was undertaken in an effort to identify the effectiveness of the Stoppa repair in case of bilateral or complex inguinal hernia, broadly in terms of intra-operative & post-operative complications, recurrence rat, operative time and other parameters. This was a prospective observational study consisting of 50 patients, conducted in Government Medical College, Baroda & Sir Sayajirao General Hospital, Vadodara from Oct 2023 to Aug 2024.

Here we are comparing our findings with other studies as shown in table.10, here the findings are consistant with other studies.

Table 10: Comparision with other studies

	Our study	Wantz Study	Devsine M el al Study	Kingsnorth AN el al Study
Mean age	57.2	57.2	57.4	61.2
Operative time	66 min	40 min	50 min	45 min
Hospital stay	2.3 days	2.2 days	2.8 days	2.5 days
Seroma formation	16%	65	4%	6%
Hematoma	18%	2%	2%	3%
Recurrence	0	0	0	0
Intestinal obstruction	0	0	0	0

In Our Study Mean Age Group Is 57.2. No Age Difference In Between Our And Wantz et Al. , Devsine M et al, Study, But Kingnorth An Et al Study Mean Age Group Is 61.2, Mean operative time is 66 minute, in other study average Mean Operative time is 45 -50 minute, Mean hospital stay is 2.3 days , which is also same in other studies. but more in Devsine M et al study is 2.8 days, complications like study seroma is 16% and hematoma is 18%.in WANTZ et al study seroma is 6% and hematoma is 2%.in DEVSINE M et al study seroma is 4% and hematoma is 2%. In our study complications like seroma and hematoma are more compared to other studies. There is no recurrence and no intestinal obstruction in our study and other studies.

Thus Rives – stoppa method can be consider an acceptable repair method for bilateral, complex, recurrent inguinal hernia.

Conclusion

Rives-Stoppa repair may offer advantages regarding reduced recurrence rates and postoperative complications. These findings have significant implications for clinical practice, highlighting the importance of considering patient-specific factors, surgeon expertise, and hospital resources when selecting the optimal surgical approach. However, further research is needed to conduct long-term comparative studies evaluating outcomes beyond recurrence rates and exploring surgical techniques and materials innovations. Such research endeavors hold the potential to improve patient outcomes, reduce healthcare costs, and advance the field of inguinal hernia repair

Limitations of study

The limitations of this study are

- Small sample size.
- Another limitation is that this was a single center study, so multicenter study should be conducted and large scale results should be published so that a standard procedure is adopted as protocol for laparoscopic E-TEP inguinal hernia repair is established.
- There was no long term physical follow up of patients so complications like recurrence of hernia after more than 6 months and other complications were not recorded.
- As we provide free services at Sir Sayajirao General Hospital, Vadodara, cost could not be evaluated in this study. References 1. Heikkinen TJ, Haukipuro K, Koivukangas P, H

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