

Role of Stoppa Technique in Management of Recurrent Inguinal Hernia

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Abstract

Background: Management of recurrent inguinal hernia poses a major clinical challenge with many procedures developed to prevent its recurrence.

Aim of Study: The aim of this study is to evaluate the role of Stoppa technique in management of recurrent inguinal hernia to prevent its re recurrence.

Patients and Methods: We conducted a prospective clinical trial. Patients aged between 21 and 70 years, underwent hernioplasty or patients with recurrent hernia were eligible for the study. Patients were followed after one, three, six and twelve months. We assessed recurrence rate and post-operative complication.

Results: Thirty patients met out inclusion criteria and were followed-up to one year. Mean age of included cases was 54 (± 7.6), 83.3% of cases were males and 16.7% were females. After one months of follow-up there was no recurrence. After three months, only one case had recurrence which was the same after six and 12 months with two cases had surgical site infection. The patient underwent to extraordinary word that we told him not to do. The infection because of diabetic patient and need medication to solve the infection and dressing with no need to hospitalization or surgery. The only case of recurrence was attributed to non compliant patient who returned to his ordinary work against our medical advice while the two cases with surgical site infection were diabetics and managed by antibiotics and regular dressing with no need for hospitalization or surgery.

Conclusion: Stoppa technique was effective in preventing hernia recurrence with low post-operative complications.

Key Words: Stoppa technique – Recurrent inguinal – Hernia repair.

Introduction

A **HERNIA** occurs when an organ pushes through an opening in the muscle or tissue that hold in place. For example, the intestines may break through a weekend area in the abdominal wall.

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Hernias are most common in abdomen, but they can also appear in the upper thigh, belly bottom, and groin areas. Most hernias are not immediately life-threatening, but they do not go away on their own [1].

Sometimes they can require surgery to prevent potentially dangerous complications. Inguinal hernias are most common type of hernia. They make up to 70% of all hernias, according to British Hernia Centre. These hernias occur when the intestines push through a weak spot or tear in the lower abdominal wall, often in the inguinal canal. Inguinal canal is found in the groin. In men, it is area where the spermatic cord passes from the abdomen to the scrotum. This cord holds up the testicles. In women, the inguinal canal contains a ligament that helps hold the uterus in place. This type of hernia is more common in men than in women. This is because a mans testicles descend through the inguinal canal shortly after birth, and the canal is supposed to close almost completely behind them. Sometimes, the canal doesn't properly close and leaves awakened area prone to hernias [1].

Several inguinal hernia repair techniques have been described; however, the gold standard is still the Lichtenstein repair [1] (tension-free with mesh), mostly because it is easy to perform and general surgeons obtain good results with this repair. When patients have large, recurrent, or multiple recurrent inguinal hernias, there are many other factors that need to be taken into consideration. A predicted difficult repair and a poor result with re-recurrence can occur [2].

The surgeon dealing with these difficult cases needs to address some questions and considerations:
(1) Why did the patient have a recurrent inguinal

hernia (RIH)-Nyhuss [2] type IV? (2) Why would the repair that we perform be better than the one chosen by the previous surgeon? (3) Could we guarantee that the treatment would result in complete recovery? (4) Re-operations are always more difficult than First-Time Inguinal Hernia (FTIH) repair-Nyhuss type III A, B, or C (5) Complications are more common for RIH [3] than for FTIH repairs, such as testicular atrophy, long-standing postoperative pain, orchiectomy for technical reasons, large hematomas or seromas, etc. (6) Surgeons are aware that the standard method of treatment is probably inappropriate for patients who have FTIH or RIH and simultaneously have especially large inguinal hernias.

There is a consensus among inguinal hernia surgeon specialists that, if the patient had FTIH repair done by the anterior approach, no matter what the technique used, the RIH repair must be done through the preperitoneal approach and the usage of mesh is mandatory. Advantages for this procedure are numerous. The procedure is done through a nonoperated area, and, therefore, the anatomy is intact. The incidence of testicular atrophy and inguinodynia are lower, and orchiectomy is rarely necessary. Missed hernias are impossible to occur because the three apertures of the Fruchaud myopectineal orifice [4] are well visualized and protected by the mesh. The placement of a large mesh into the preperitoneal space allows for an even distribution of forces throughout the whole prosthetic area, in accordance with Pascal's law. Suture of the mesh guarantees a secure fixation in such way that re-recurrence is almost nil. Giant hernias are much more difficult to repair through the anterior approach, not only because of the large volume to be reduced, but also due to the retroperitoneal sliding component that usually occurs [5].

Moreover, even with a large wall defect, sometimes, it is not large enough to reduce the hernial content, and necessitates the surgical widening of the opening, leading to an even larger defect in the posterior wall. This widening, coupled with a large orifice which the surgeon enlarges, compels him/her to avoid using structures unfit for holding the mesh sutures safely. For these reasons, we think that the preperitoneal approach for these complex hernias is the most feasible solution. For very large hernias, we use Progressive Pneumoperitoneum Preoperatively (PPP) [6] because, in such large hernias, the loss of the abdominal domain seems to be a complicating factor that can jeopardize the results. The purpose of this study was to review our experience with the open preperitoneal approach using meshes for RIH and large inguinal hernias, as well

as PPP in very large hernias, to determine the applicability, safety, and efficacy of the procedure. We usually do not use the laparoscopic approach for the average size RIH due to economical reasons; however, we agree that it is also an option that is available.

Aim of the work:

The aim of this study is evaluate the role of Stoppa technique in management of recurrent inguinal hernia to prevent its recurrence. When patients have recurrent, or multiple recurrent inguinal hernias Stoppa procedure has a great role on them.

Patients and Methods

This prospective trial included thirty (30) who underwent a planned hernioplasty with mesh by Stoppa technique following hernia repair by traditional hernioplasty for one year from December 2018 to December 2019.

Inclusion criteria:

- Patients aged from 21-70.
- Patients from male and female gender.
- Patients underwent hernioplasty from 6 month to 5 years age and they have recurrent hernia.

Exclusion criteria:

- Extremes of age.
- Recurrent hernia due to other causes such as BPH.

Methods:

Patients were selected by simple random method. Our patients were subjected to the following:

Pre-operative evaluation:

- 1- *A full history:* Including age, marital status, parity, presenting symptoms and menstrual history. Also a complete family and obstetric history were included.
- 2- *General and local examination:* Abdominal scars, hernias, palpable masses or gallbladder.
- 3- *Laboratory investigations:* CBC, Bleeding profile, LFTs, KFTs, alkaline phosphatase and viral markers.
- 4- *Sonography:* To detect and exclude other pathologies.

Surgical technique:

The patient was positioned at the dorsal horizontal decubitus in a mild Trendelenburg position. A single dose of cephalothin was given intrave-

nously immediately before the start of the operation. A midline infraumbilical incision was performed, and the preperitoneal space was opened. Dissection was performed in the retropubic space of Retzius in front of the bladder as far as the prostate. The dissection was extended laterally behind the rectus muscles and epigastric vessels in the retroinguinal space as far as the iliopsoas fascia. The sac of the inguinal hernia was identified; when the inguinal hernia was indirect, the sac and the spermatic cord were gently retracted, and the spermatic elements were carefully isolated.

The preperitoneal cleavage plane was extended to expose the deep aspect of the obturator region below, the iliac vessels laterally, and the fascia of the psoas major muscle. The direct hernia sacs were inverted with a purse-string suture, and the indirect hernia sac was opened and a finger introduced within it to facilitate the isolation of the spermatic elements. In 8 patients the indirect hernia sac was resected, and in 22 patients the parietal peritoneum was inadvertently opened and its borders were approximated by continuous suture with polyglycolic acid 2-0. The contents of the spermatic cord were then parietalised. Careful hemostasis was carried out, and a chevron-shaped polypropylene mesh was placed and distended enough to guarantee the most flattened accommodation of the prosthesis in the preperitoneal space. The prosthesis was sutured at the pectineal ligament and the fascia of major psoas muscle with 2-0 polypropylene stitches to prevent dislocation. The dimensions of the mesh were measured in centimeters.

Post-operative evaluation:

All patients underwent an abdominal pelvic Computed Tomography (CT) scan to detect the presence of any fluid collection, with particular attention to the consistency and the volume in the preperitoneal space. All patients will be discharged after the CT scan. All patients were instructed to return to the division of surgery if presenting with fever, incisional or inguinal pain, local ecchymosis, hematoma, or scrotal swelling. The ambulatory follow-up was on the 15th POD, when a physical examination was performed to search for ecchymosis, seromas, hematomas, inflammation, or infectious signs at the infraumbilical or inguinal regions.

Statistical analysis:

Abstracted data were compiled and analyzed using SPSS version 21 (SPSS Inc., Chicago, IL). Continuous variables are presented as means (\pm Standard Deviation [SD]), and categorical variables

are presented using relative frequency distributions and percentages. Continuous variables were compared using Student's *t*-test or the Mann-Whitney test, and categorical data were analyzed using the chi-square test, Yates' continuity correction, Fisher's exact test, and/or unadjusted Odds Ratios (ORs) as appropriate. Statistical significance established at $p \leq 0.05$.

Results

Table (1): Show age of the included patients.

	Mean	SD	Median	Maximum	Minimum
Age	54.0	± 7.6	53.0	68.0	41.0

Table (2): Show gender distribution of the patients.

Gender	N	%
Female	5	16.7
Male	25	83.3

In the present study, we included 30 patients with a mean age was 54.0 (± 7.6) and range 68.0 between 41.0 (Table 1). 83.3% of the patients were males and 16.7% were females (Table 2).

Table (3): Show rate of recurrence before operation.

Recurrence	N	%
Once	15	50.0
Twice	10	33.3
Triple	5	16.7

50% of cases had recurrence only once, 33.3% had recurrence twice and 16.7% had recurrence three times before (Table 3).

Table (4): Show complication occurred.

	N	%
<i>Recurrence:</i>		
Yes	1	3.3
No	28	93.3
Unknown	1	3.3
<i>Other complications:</i>		
Infection	2	6.6

Majority of the patients did not have recurrence which accounted for 93.3% of them besides two cases had infection (Table 4).

Table (5): Show serial follow-up of recurrence rate.

Recurrence	N	%
One months	0	0.0
Three months	1	3.3
Six months	1	3.3
One year	1	3.3

Serial follow-up of recurrence rate was as following; after one month's there was no recurrence



Fig. (1): Pre-operative bilateral inguinal hernia.

and after three, six, twelve; only one case had recurrence (Table 5).



Fig. (2): Hernial sac content.

Discussion

Inguinal hernia repairs are commonly performed operations. Recurrence of hernia is one of the most reported complications. First time repair of recurrence hernia usually fails in 1% to 30% of cases, second-time recurrent repairs do so at the rate of 3% to 35% and third-time or more repairs fail in 50% of cases [7].

Stoppa technique gained popularity in management of recurrent hernia. Although the procedure useful for the repair of all hernias of the groin, in practice are mainly used to manage complex hernias at high risk for recurrence and recurrent groin hernias [8]. The main idea of Stoppa technique is to reinforce the peritoneum with a giant polyester mesh which leads to eliminating hernias of the groin [9].

Hence, we conducted a prospective study to evaluate efficacy of Stoppa technique in management of cases with recurrent inguinal hernia. Mean age of included cases was 54 (± 7.6), 83.3% of cases were males and 16.7% were females. After one months of follow-up there was no recurrence. After three months, only one case had recurrence which was the same after six and 12 months with two cases reported to had surgical site infection.

Our result was consistent with previous studies. A study included patients with bilateral hernias, mostly bilateral recurrent and often repeatedly recurrent with a wide range of follow-up between four and nine years. Only one case out of 75 patients had recurrence after two months and another case with deep infection that was treated without removing mesh [10]. These result encouraged the

authors to suggest Stoppa operation as the surgical choice for any recurrent inguinal hernia [10].

Another study included patients with bilateral recurrent hernia and patients with risk factors for recurrence, including chronic cough, connective tissue disease, or other lower abdominal hernias. These patients underwent Stoppa repair with minor modifications. Only three cases reported recurrence out of 420 cases with three local seroma formations. No post-operative neuralgia, chronic pain or testicular atrophy, mesh infection or deaths were reported [11].

A study included 250 cases with high risk factor of recurrence i.e. COPD, BPH, poor abdominal tone and previous surgery. Recurrence was reported on four cases. Minor complications like seroma were managed conservatively with no sequelae [12].

Early recurrence (usually after six months) that was reported in previous studies most probably due to technical error. As Stoppa repair seals inguinal, femoral, and obturator canals as well as all other potential sites of weakness in the lower abdomen [13] which make late recurrence unlikely.

This is supported in our study as only one case had recurrence after three months with no further recurrence reported during follow-up. In our study, patients had limited physical activity during first month after surgery and after three months; patients started to regain their physical activity which was associated with recurrence of hernia in only one case with no further recurrence during follow-up.

With inclusion of laparoscopic hernia repair, a debate raised about what is the best technique to

use. Laparoscopic approach is usually challenged in patients with recurrent or large chronic hernia due to the difficulty in hernia reduction or due to associated adhesions. Besides laparoscopic approach requires the use of a smaller mesh and its fixation which increase the risk of nerve injury. In contrary Stoppa repair uses a large mesh which may not require fixation [2,11,14].

Size of the prosthetic used in hernia repair is an important predictive factor of hernia recurrence. A study included patients with bilateral recurrence hernia compared Stoppa's technique with the use of great bilateral prosthesis to Rives' technique with the use of little unilateral prosthesis. Result showed no recurrence in Stoppa group compared to 5.7% recurrence rate in Rives group besides 3.1 morbidity in Stoppa group versus 9.9% morbidity in Rives group [15].

Moreover, the use of a single mesh yielded similar result to the use of double mesh [16]. But single mesh is associated with lower cost. However the bigger size of mesh is associated with more intense inflammatory response [17].

Several controlled studies conducted to compared Stoppa operation (open) to other techniques (mainly to laparoscopic approach). A study that compared Stoppa operation to Transabdominal Preperitoneal (TAPP) in 100 patients with inguinal hernia after three years follow-up. They found only one case had had recurrence in Stoppa group versus three cases in TPP group but the difference between group was not statistically significant. However TPP group was superior to Stoppa group regarding hospital stay and delay in return to work and post-operative comfort but operating time was longer in TPP group. The authors concluded both techniques had the same long term recurrence rate but the main difference was post-operative period [18].

Another study with longer follow-up (4 years) compared TPP, Shouldice versus Stoppa repair in 461 patients. After 4 years, recurrence rate was 10.5% Stoppa group versus 7.4% in TPP group and 12.5% Shouldice group. However after one year. Recurrence rate was 0% for Stoppa procedure versus 2.2% in the laparoscopic group and 1.2% for Shouldice. But the result was not statistically significant. The reason for differences of recurrence rate at one and four years may be due to loss of patient during follow-up as 95% of patients were followed after one year and 79% of patients were followed after four years [19].

A non-randomized prospective study compared Stoppa technique to laparoscopic approach in

patients with bilateral inguinal hernia after one year of follow-up. Recurrence rate was similar in both groups (2% in Stoppa group versus 1.1% in laparoscopic group). Similar to study above [18] laparoscopic approach was superior to Stoppa technique regarding post-operative pain, hospital stay and duration of disability but with longer duration time [20].

One of the main advantages of Stoppa procedure, it is an easy and safe operation but requires a learning period to achieve optimum results. A study assessed the learning curves for stoppa techniques. Within five years; operative time decreased from 100min to 61-66min. Regional anaesthesia was performed in 25% of cases at first year and 80-90% in the last years; hospital stay decreased from 5.1 to 1.2 days and morbidity decreased from 50% to 12-16% [21].

Our study had several limitations. It is one arm study that lacks a control group to validate result of stoppa group with. However our result was consistent with result from previous studies. Limited number of patients met our inclusion criteria. We could not assess long term outcomes in included patients.

Conclusion:

In conclusion, Stoppa technique was effective in preventing hernia recurrence with low post-operative complications.

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دور طريقه ستوبا في عمليات الفتق الإربي المرتجع

الخلفية: تشكل إدارة الفتق الإربي المتكرر تحدياً سريرياً كبيراً مع العديد من الإجراءات التي تم تطويرها لمنع تكرارها.

هدف العمل: الهدف من هذه الدراسة هو تقييم دور تقنية Stoppa في إدارة الفتق الإربي المتكرر لمنع تكراره.

المرضى والطرق: أجرينا تجربة سريرية مستقبلية. كان المرضى الذين تتراوح أعمارهم بين ٢١ و٧٠ عاماً، والذين خضعوا لعملية رأب الفتق أو المرضى الذين يعانون من فتق متكرر، مؤهلين للدراسة. تمت متابعة المرضى بعد شهر وثلاثة وستة وإثنى عشر شهراً. قمنا بتقييم معدل التكرار ومضاعفات ما بعد الجراحة.

النتائج: إستوفى ثلاثون مريضاً معايير الإشتمال وتمت متابعتهم لمدة عام واحد. كان متوسط عمر الحالات المشمولة ٥٤ (٧.٦±)، ٨٣.٣٪ من الحالات كانت ذكور و١٦.٧٪ إناث. بعد شهر واحد من المتابعة لم يكن هناك تكرار. بعد ثلاثة أشهر، تكررت حالة واحدة فقط والتي كانت هي نفسها بعد ستة و١٢ شهراً مع إصابة حالتين بعدوى في موقع الجراحة. خضع المريض لكلمة غير عادية قلنا له ألا يفعلها. الإصابة بسبب مريض السكر ويحتاج إلى دواء لعلاج العدوى والتضميد دون الحاجة إلى التنويم أو الجراحة. ونسبت حالة التكرار الوحيدة إلى مريض غير ممثّل عاد إلى عمله المعتاد خلافاً لنصائحنا الطبية، بينما كانت الحالتان المصابتان بعدوى موقع الجراحة من مرضى السكر وتم إدارتهما بالمضادات الحيوية والتضميد المنتظم دون الحاجة إلى الإستشفاء أو الجراحة.

الخلاصة: كانت تقنية Stoppa فعالة في منع تكرار الفتق مع مضاعفات منخفضة بعد الجراحة.