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RESEARCH ARTICLE

A comparative study between herniorrhaphy and hernioplasty.

Dr. Albina^{1*}, Prof. Iqbal Aziz² and Dr. Mohd. Nadeem Khan³

1. Assistant Professor, Department of Surgery, F/O Unani Medicine, Aligarh Muslim University, Aligarh, U.P. India

Professor, Department of Surgery, F/O Unani Medicine, Aligarh Muslim University, Aligarh, U.P. India
 Assistant Professor, Department of Anatomy (Tasreeh-ul-badan), F/O Unani Medicine, Aligarh Muslim University, Aligarh, U.P. India

Manuscript Info

Abstract

..... Manuscript History: **Introduction:** Inguinal hernia surgery is the commonest done surgery in any hospital. Different types of repairs have been experimented, but none could Received: 12 April 2015 be labelled as the ideal surgical technique. Final Accepted: 29 May 2015 Aim: We conducted this study to analyze the best method of hernia repair by Published Online: June 2015 comparing Bassini's repair and mash repair. Materials and Methods: Study was conducted on 134 patients, Mesh repair Key words: (with a new technique that is placing the mesh just below the external oblique aponeurosis instead of, over or below the fascia transversalis) and Inguinal Hernia, Mesh, repair Bassini, Fascia tranversalis, Bassini's repair were performed in two groups of 67 patients each, by the Aponeurosis same surgical team. After operation, the patients were evaluated for time of mobilization from the bed, hospital stay, recurrence, cost effectiveness and *Corresponding Author postoperative complications. Patients were followed-up, in OPD for further assessment after one week postoperatively and monthly there-after for one vear. Dr. Albina Results: Post-operative pain was observed in 1 (1.49%) of the patients in mesh repair in comparison to 3 (4.47%) in Bassini's repair. Wound infection in 1 (1.49%) case of mesh repair &2 (2.98%) cases in Bassini's repair. As far as recurrence is concerned there were 2 (2.98%) recurrences in mesh repair while 4 (5.97%) patients with Bassini's repair. Conclusion: The size of mesh should be appropriate and it should always be fixed to the public tubercle. In mesh repair we propose a new technique in which we have placed the mesh just below the external oblique apponeurosis instead of just over or below the fascia transversalis. Copy Right, IJAR, 2015,. All rights reserved

INTRODUCTION

The strengthening of the posterior wall of inguinal canal has always been the endeavour of surgeons, as even today in 21st century there is no technique which can give 100 % assurance for successful repair in hernia.

The need and method of repairing the posterior wall of inguinal canal was first noted and described in documented form by Edoardo Bassini an Italian surgeon in 1884 [6], though Kocher too modified the technique three years later in 1887, but the basis of repair remained the same, i.e. joining the lower fibres of conjoined muscles with the posterior margin of the inguinal arch, without use of any foreign material other than necessary sutures, accordingly it is believed that using this technique correctly, good results can be obtained even today, but still the recurrence rate

has been reported as 5-7% in Bassini's repair by various surgeons. Bassini himself reported the recurrence rate as 3% in his series of inguinal hernia operation in 262 patients in 1887 [3].

Later in 1952 an improved version of Bassini's repair was evolved by Shouldice in Shouldice clinic of Toronto, Canada [36] ,where the recurrence rate was reported as 0.5% - 1% in primary inguinal hernia repair and recurrence rate as 2-4% for repair of recurrent inguinal hernia [37].

The tissue repairs lead to tension in the scar leading to discomfort in the region and the tension in the repaired tissue is supposed to be one of the important factors in recurrence of these inguinal hernias.

Hence the need for tension free repair was loudly discussed in the congregation discussing Herniology in 1980's. The basic principle of tension free repair being reinforcement or replacement of the fascia transversalis by interposition of synthetic mesh between muscle and the peritoneum so as to restore the strength of the abdominal wall against the intra-abdominal pressure, this synthetic mesh becomes a kind of untearable endo-abdominal neofascia that prevents the recurrence.

Material and Methods

The present study entitled a comparative study between herniorrhaphy and hernioplasty was conducted on 134 patients, in the Department of Surgery (Jarahat), Ajmal khan Tibbiya Collage Hospital, Aligarh Muslim university. A written and well informed consent was taken from the patients before participation into the study

Inclusion Criteria:

We included the male patients having direct or indirect inguinal hernia, age group ranging from 20-60 years.

Exclusion Criteria:

Patients with significant coexisting morbid conditions such as diabetes mellitus, heart disease, malignancy, haematological disorders, history of drug abuse or chronic debilitating diseases and BPH were excluded from this study.

Methodology:

Permission from the institutional ethical committee was taken before starting the study. A written and well informed consent was taken from the patients before participation into the study.

Before surgery a detailed history was obtained, patients were examined in a worm room in supine as well as erect posture. side, size, shape, extent of hernia, skin over the swelling, cough impulse, reducibility, ring occlusion test, finger invagination test, previous scar of herniotomy and in cases of complete hernia, testis was examined to assess whether the testis is covered by hernial sac or it is felt separately.

The patients were operated under local anaesthesia, spinal anaesthesia or genaral anaesthesia with standard premedication and preparation. Inguinal oblique incision was used in the patients. Mesh repair (with a new technique that is placing the mesh just below the external oblique aponeurosis instead of, over or below the fascia transversalis) and Bassini repair were performed in two groups of 67 patients each, by the same surgical team. During operation, size of the sac, content of the sac, extent of the sac, defect of Hesselbach' s triangle, lateral displacement of inferior epigastric vessel, lipoma of cord and operating time were noted.

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After operation, the patients were evaluated for time of mobilization from the bed ,testicular pain testicular atrophy, postoperative pain, retention of urine, wound seroma, wound infection, wound dehiscence, recurrence, mesh rejection, sinus formation, postoperative pneumonia, Hydrocele, scrotal haematoma, cord thickening, periostitis of the public tubercle, sexual dysfunction, hospital stay, cost effectiveness and postoperative follow-up.

Patients were followed-up, in OPD for further assessment after one week postoperatively and monthly there-after for one year.

Results and Observations

The study was conducted on 134 patients (67 patients each for Mesh repair & Bassini's repair). The duration of study was 3 years. In our study we found that maximum patients of inguinal hernia were in the age group of 20-30

years i.e. 34%, as shown in table no.1, while the second most common group affected was 50-60 years i.e. 30.60%. However, hernia can occur at any stage of life.

Heavy work has always been blamed to cause hernia. The same has been observed by us as 82 (61.20%) of our patients were heavy workers while only 52 (38.80%) of our patients were sedentary workers as shown in table no.2. Classically right sided inguinal hernias are notorious for their high incidence, the same was found in our study as 88 (65.67%) of the patients were having right sided inguinal hernias in comparison to 46 (34.33%) who were having left sided inguinal hernias as shown in table no.3.

Table no. 4 shows type of herniation and we found that the incidence of indirect inguinal hernia was for higher at 94 (70.15%) than those having direct inguinal hernias 40 (29.85%). In table no.5, we observed the size of the sac and found that in 44 (32.84%) patients, the size of the sac was 2-2.9 inches, while it was 3-3.9 inches in 33 (24.63%) of the patients. 4-4.9 inches was the size which was found in 15 (11.20%) patients. 25 (18.66%) patients had 5-5.9 inches long sac while as large as 7 inches was the size of the sac in 17 (12.69%) patients.

While operating we used two different sizes of the mesh that is 3×2 (inches) initially and later on shifted to a larger size that is 3×3 (inches). It is a very important observation, we found that there were 2 (7.40%) recurrences when we were using mesh with a size of 3×2 (inches) in 27 patients but when we started using 3×3 (inches) mesh, there was no recurrence at all as being shown in table no. 6.

There was negligible difference, when we compared the operating time of both the procedures i.e. mesh repair (mean 35.0 ± 8.7) and bassini repair (mean 35.4 ± 5.6) as being shown in table no.7.

Table no. 8 shows the mean duration time of the hospital stay in both the repair, it was not much different. Table no. 8 shows, that the mean time of mobilisation from the bed was more or less same in both the repairs hence it can be concluded that mobilization of the patient from the bed is not a major factor in selecting the procedure.

As far as cost effectiveness in concerned mesh repair proved to be slightly costlier (Mean 1461.4 \pm 169.4) than Bassini repair (Mesh 970.8 \pm 112.9). The main difference is supposed to be due to the cost of mesh as observed in table no.9.

Table no. 10 shows the comparison of the Post-operative complications between the two repairs. Post-operative pain was observed in 1 (1.49%) of the patients in mesh repair in comparison to 3 (4.47%) in Bassini repair. There was no case of testicular pain/orchitis in either of the operations, neither there was any case of sexual dysfunction, post-operative pneumonia, mesh rejection, retention of urine, hydrocele, wound dehiscence & sinus formation in either of the repairs. But there was wound infection in 1 (1.49%) case of mesh repair &2 (2.98%) cases in Bassini repair. Wound seroma was found in 2 (2.98%) and 3 (4.47%) in mesh repair and Bassini repair respectively. There was cord induration in 2 (2.98%) patients with mesh repair and 1 (1.49%) in Bassini repair. Scrotal haematoma was found in 3 (4.47%) in both of the series while Periostitis of the Pubic tubercle was reported in 1 (1.49%) of Bassini repair.

As far as recurrence is concerned there were 2 (2.98%) recurrences in mesh repair while 4 (5.97%) patients with Bassini repair had recurrence.

AGE(years)	MESH REPAIR(n=67)	BASSINI REPAIR(n=67)
20-30	21	25
31-40	10	11
41-50	13	13
51-60	23	28

Table no. 1: Distribution of patients according to age

Fable no. 2: Distribution of	patients	according to	the nature of work
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OCCUPATION	STRENUOUS WORK (n=134)	SEDENTARY WORK(n=134)
NO. OF PATIENTS	82	52

Table no. 3: Distribution of patients according to the side of hernia

SIDE	MESH REPAIR	BASSINI REPAIR	%
RIGHT	45	43	65.67 %
LEFT	22	24	34.33 %

Table no. 4: Distribution of patients according to type of hernia

TYPE OF HERNIA	MESH REPAIR	BASSINI REPAIR	%
DIRECT	19	21	29.85 %
INDIRECT	48	46	70.15 %

 Table no. 5:
 Distribution of patients according to size of sac

SIZE OF THE SAC (inches)	MESH REPAIR	BASSINI REPAIR
2-2.9	21	23
3-3.9	16	17
4-4.9	06	09
5-5.9	14	11
6-7.0	10	07

Table no. 6: Distribution of patients according to size of mesh used

SIZE (inches)	NO. OF PATIENTS	%	RECURRENCE
3×2	27	40.30 %	02 (7.4 %)
3×3	40	59.70 %	00 (0.0 %)

Table no. 7: Duration of procedure

MESH REPAIR		BASSINI REPAIR	
RANGE (minutes)	20-55	25-55	
MEAN(minutes)	35.0 ± 8.7	35.4 ± 5.6	

Table no. 8: Duration of hospital stay

	MESH REPAIR	BASSINI REPAIR
RANGE (days)	1-11	1-12
MEAN (days)	5.0 ± 2.7	4.8 ± 2.6

Table no.9: Time of mobilisation of patients from the bed

	MESH REPAIR	BASSINI REPAIR
RANGE(hours)	13-20	13-20

MEAN(hours)

 16.6 ± 1.9

 17.2 ± 1.9

Table no.10: Cost effectiveness

	MESH REPAIR	BASSINI REPAIR
RANG	Rs 1100-1900	Rs 800-1250
MEAN	Rs 1461.4±169.4	Rs 970.8 ± 112.9

Table no.11: Post-operative complications

COMPLICATIONS	MESH DEDAID	%	BASSINI	%
	KEI AIK		KEI AIK	
Post-operative pain	1	1.49 %	3	4.47 %
Testicular pain/ orchitis	0	00.00 %	0	00.00 %
Wound infection	1	1.49 %	2	2.98 %
Sinus formation	0	00.00%	0	00.00 %
Wound dehiscence	0	00.00 %	0	00.00 %
Wound seroma	2	2.98%	3	4.47%
Hydrocele	0	00.00 %	0	00.00 %
Cord induration	2	2.98 %	1	1.49 %
Scrotal haematoma	3	4.47 %	3	4.47 %
Periostitis of the pubic	0	00.00 %	1	1.49 %
tubercle				
Retention of urine	0	00.00 %	0	00.00 %
Mesh rejection	0	00.00 %	0	00.00 %
Recurrence	2	2.98 %	4	5.97%
Post-operative pneumonia	0	00.00 %	0	00.00 %
Sexual dysfunction	0	00.00 %	0	00.00 %

Discussion

Ebers Papyrus probably describes the first instance of hernia in 1550 B.C. [1]. The mummy of Ramses V, which dates back to 1157 B. C. shows scrotal hernia and hydrocele or perhaps both [2].

Hernia is supposed to be due to weakness of the structures comprising the abdominal wall and recurrences after operation are frequently explained on the basis of poor tissues. It is not surprising therefore, that search had been made for material to supplement the organic tissues and for techniques of reinforcing the anatomical musculofecial layers. During the last 75 years a wide variety of biological and inorganic substitutes are being used in hernia repair: The statement "there is a place for prosthesis in the armamentarium of the surgeon for use in hernia operations", a few would deny.

Edoardo Bassini (1844-1924) described a new method for treating the inguinal hernia by reconstructing the inguinal canal followed by low incidence of mortality, complications and recurrence, hence he is considered to be the father of modern herniorrhaphy [3-5].

Francis Usher in 1960 introduced polypropylene (Prolene mesh) as a prosthesis, strengthening the weak anterior abdominal wall [6].

Hernia can occur at any stage of life and in our study the most common affected age group is 51-60 years at 38% which is in confirmation with the previous studies of Lichtenstein (41.9%) [7] Kowli (40%) [8]. Blame it on geriatric condition but the second most common affected age group in our study was 20-30 years age group with 34% incidence rate which is quite high in comparison to previous studies of Madden (5.4%) [9], Palumbo (11.2%) [10] and Ramachandran (16%) [11].Ours is a hospital where most of the patients are from lower income group and most of them are heavy worker or rickshaw pullers which can justify the higher incidence. This factor also applies on Tab-2 where the incidence of hernia in strenuous workers is 61.2%.

The more affected side in our study was right side with 65.67% of patients having right inguinal hernia. This finding is similar to the studies of Bhagat (63.2%) [12] and Ramachandran (52.3%) [11], while 34.33% of the

patients in our study were left sided inguinal hernia, which again is in conformity with the same studies of Bhagat [12] and Ramachandran [11] having 36.8% and 34% left inguinal hernia respectively as shown in Table-3.

Indirect inguinal hernia is a more common variety of the two types. Ramachandran [11] reported 68% incidence of indirect inguinal hernias in his study while Stephenson [13] reported the same to be 64%. Ours is a rate of 70.15% as shown in Table-4.

A very important finding that is contents of the sac has been given very little importance in the past but we observed that in 40.3% of cases omentum was found as the content of the sac which explains the usual complaint of pain in abdomen in the patients. In 32% the sac was empty but intestine was found in 26.1% patients only as shown in table-6. 68.66% of our patients had incomplete inguinal hernia while the remaining 31.34% had complete variety as shown in table 7.

During the procedure we closely observed the anatomical defects which may have lead to the hernia. At operation, we found that 27 patients had finger defects, 12 of them underwent mesh repair with 1 recurrence and 15 patients underwent Bassini repair with 2 recurrences. 9 patients had thumb defects, 4 of them received mesh repair and 5 Bassini repair but there was no recurrence in either of the repairs. 4 patients who were having major defects in Hesselbach's triangle had no recurrence after 3 of them underwent mesh repair and 1 Bassini repair. 3 of our patients had lateral displacement of inferior epigastric vessels. All of them were repaired using Bassini technique with no recurrence. It shows that recurrence has nothing to do with the size of the defect as all the 3 recurrences were reported by the patients having finger defects, while the remaining 13 patients having major defects had no recurrence at all as shown in table 9.

Table 10 shows the 2 sizes of mesh were used during mesh repair. We used 3 x 2 inches and 3 x 3 inches mesh in hernioplasties. In 27 (40.3%) patients where 3 x 2 inches mesh was used, there were 2 (7.4%) recurrence, while when we used 3 x 3 inches mesh , there was no recurrence at all, even when we used it in 40 (59.7%) patients. This shows the significance of the size of the mesh. Other important factor in the recurrence could be the non-fixation of the mesh on the medial aspect, at public tubercle when using 3 x 2 inches mesh. As we changed the size of mesh to 3 x 3 inches and also started to fix the mesh with chromic catgut no.1-0 to the public tubercle after 2 recurrences within 1 year post hernioplasties, there was no recurrence after these changes in technique. The same causes have been reported by Lichtenstein [14], MOK [15], Amid [16], Friis [17] and Kurzer [18].

The operation time was considered as the time taken from the skin incision to the last stitch applied. The median operation time in mesh repair was 35 ± 8.7 (Range 20-55) minutes while it was 35.4 ± 5.6 (Range 25-55) minutes for Bassini repair as shown in table 11. It proves that duration of the procedure doesn't vary in these two repairs and cannot be taken as a factor while selecting the better technique. Our results and time taken in procedures are comparable with Wilson [19], Dirksen [20], Faik [21] and Bringman [22].

The duration of hospital stay as shown in table 12 was 5 ± 2.7 (Range 1-11) days and 4.8 ± 2.6 (Range 1-12) days for mesh repair and Bassini repair respectively. The hospital stay of our patients seems to be longer then with the studies of Faik [21], Wilson [19], and Devies [23] but comparable with Faik et al [21] (3.8 days). The longer hospital stay can be explained as large number of our patients were aged and had no urgency to return to work, these patients were discharged only after stitch removal on 7th post operative day.

As shown in table 13 all of our patients were mobilized from the bed within 24 hours. The same was the policy observed by Tayler [24], Dirksen [20], Wilson [19] and Faik [21].

As far as cost effectiveness is concerned, mesh repair was a little costlier at Rs.1461.4 \pm 169.4 (Range 1100-1900) while in Bassini repair the expenses of the operation were Rs.970.8 \pm 112.9 (Range 800-1250) as shown in table 14.The reason being the cost of the mesh.

The patients were followed for 1 year postoperatively. There was no mortality in any of our patients. The most common complication after mesh repair and Bassini repair was scrotal haematoma being 4.47% in each type of repair. Wilson [19] reported scrotal haematoma in 1.6%, Bringman (7.8%) [22] and Awad (12.6%)[25], Wound Seroma was reported in 4.47% cases in Bassini repair and 2.98% in mesh repair. All these were the cases having complete inguinal hernia where are required more dissection. This responded to the conservative treatment. Beside this complication, postoperative pain was 4.47% in Bassini repair and 1.49% in mesh repair probably due to more tissue handling in comparison to Kumar (11..2% in mesh repair) [26], Hindmarsh [27] (1% in mesh repair) and Bringman [22] (1.9% in mesh repair).

Wound infection was found in 1.49% and 2.98% cases in mesh and Bassini repairs respectively. Our results are comparable with the results of Thill [28] and Gilbert [29] while higher incidences have been reported by Faik (13.1%) [21].

There were 2.98% cases of cord inducation in mesh repair in comparison to 1.49% in Bassini repair.Wilson [19] reported 1.6% cord inducation after mesh repair.

There was only a single case (1.49%) of Periostitis of the public bone.

These were 2 (2.98%) recurrences in mesh repair in comparison with Awad (2.7%) [25]. Lichtenstein (0.7%) [7], Amid (0.1%) [16], Mc Gillicuddy (0.5%) [30] and Kark (0.1%) [31] reported recurrences. Our incidence rate seems to be higher but these 2 recurrences were seen in cases where we were using 3 x 2 inches mesh initially but when we started to use 3 x 3 inches mesh, there was no recurrence at all. There were 5.97% cases of recurrence in Bassini repair which are in proximity with Vicq (8.7%) [32], Boudet (11%) [33] and Faik (5.1%) [21].

There were no cases of Testicular pain/orchitis, sinus formation, wound dehiscence, hydrocele, retention of urine, postoperative pneumonia, mesh rejection, sexual dysfunction and testicular atrophy as shown in table 15. Amid [16] reported orchitis (0.03%) in mesh repair. Lichtenstein [7] noted down sinus formation (0.02%) in mesh repair while Paul [34] reported 3.2% in Bassini repair. Lichtenstein [7] observed hydrocele (0.6%) in mesh repair. Vrijland [35] reported urinary retention (1%), postoperative pneumonia (1%) in non mesh repair but wound dehiscence (1%) in mesh repair. Lichtenstein [7] observed testicular atrophy (1%) in mesh repair but Paul [34] reported the same to be 0.8% in Bassini repair.

Regarding the site of placement of mesh, we preferred to keep & fix the mesh in between the conjoined tendon & aponeurosis of external oblique, leaving the spermatic cord to lie on it. The placement of mesh at this level required least dissection after Herniotomy and then we observed that the post-operative pain was there in a very few patients (1.49%). The recurrence rate in our technique was comparable to the techniques of others who placed the onlay or inlay mesh.

Conclusion

Inguinal hernia can occur at any stage of life and in our observation it is the 51-60 years of age which is affected the most previous studies are of view that inguinal hernia occurs in male population predominantly and strenuous work can be a precipitating factor and right side is the side, affected most. We also have reached the same conclusions.

Indirect inguinal hernia was the more common variety, whatever be the age, nature of work and the built of the patients as 70.15% of our patients were having the said variety.

During the procedure we observed the nature of defect which probably may have lead to hernia and tried to correlate the same with the recurrence but we conclude that there is no relation between the size of the defect and recurrence.

Another important factor we want to emphasize upon is that whenever mesh repair is to be performed, mesh should be of appropriate size moreover it should always be fixed to the public tubercle with to avoid rolling over of the mesh on itself and displacement of the mesh.

As far as the cost effectiveness of the procedures is concerned, there is no major deference and the only difference is being the cost of the mesh itself.

In mesh repair we propose a new technique in which we have placed the mesh just below the external oblique apponeurosis instead of just over or below the fascia transversalis as it involves less dissection and hence less morbidity. Our results are comparable with previous studies in every aspect.

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