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Research Article

Combined Approach for re Recurrent Inguinal Hernias

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Abstract

Introduction: Despite of rapid developments in laparoscopic and robotic technologies and different sophisticated approaches, - re recurrent hernia or secondary recurrence is still a big challenge for even experienced surgeons in specialized referral centers. There are no reliable full scaled studies available currently for the re recurrent inguinal hernias. Moreover, there are no guidelines and/or metanalysis for the management of aforementioned pathology. On the basis of modern literature review (which is mainly represented by few case reports) frequency of the re recurrent inguinal hernias is rather high (especially out of hernia centers) and varies in 4-7 % of range. We suggest that our results will somehow contribute to development of management methodology for this problem.

Materials and Methods: 138 patients with re recurrent hernias studied retrospectively. This number was allocated into 2 groups on the basis of previously performed types of surgeries (follow up for 1 year). The group A (82 patients) comprised re-recurrences only after anterior (Basin + Lichtenstein; Shouldice + Lichtenstein; Lichtenstein + Lichtenstein) or only posterior (TAPP +TAPP; TEP+TAPP) approaches.

Group B (56 patients) involved those re recurrences which developed after operations performed with anterior-posterior approaches (Basin + TAPP; Lichtenstein +TAPP; Lichtenstein + TEP; TAPP+Lichtenstein).

Group C (control) was represented by only those 140 primary recurrent hernias (age >16 years) that did not develop a re-recurrence -inclusion criterion (follow-up 1 year), from which 70 recurrent hernias developed after primary Lichtenstein and the other 70 - after primary TAP repairs.

Results: As for group A, here the principle of treatment was no different from the principle of treatment of primary recurrent hernia (guideline, Herniamed registry), where, despite the secondary recurrence, we had an anatomically unchanged space from which we carried out the approach.

For B group patients so called combined approach was used (because of the both planes were disturbed), in particular, we started the operation with a laparoscopic revision of the abdominal cavity, and in case of significant anatomical changes in the back space and rough healing developed around the prosthetic material, we switched to the open method (anterior approach – Lichtenshtein).

The Mean operation time is significantly longer in group B compared to group A and group C, and significantly longer in group A compared to group C.

In group B, compared to group C, there was a significantly higher incidence of: intraoperative bleeding, intraoperative damage to the vas deferens and other structures, infected mesh, seroma, postoperative wound infection, need for drain-

age, postoperative pain (1 year after surgery), tertiary recurrence (within 1 year of the first surgery). In group A, the incidence of intraoperative bleeding and tertiary recurrence was significantly higher than in group C.

Conclusion: The repair of re-recurrences in inguinal hernia is associated with increasingly more unfavorable outcomes. For re-recurrent hernias when both anterior and posterior planes are utilized in previous surgeries we recommend combined, - anterior-posterior approach as the best possible surgical technique. It is highly recommended to start the combined operation with exploratory laparoscopy and if it is feasible to convert diagnostic laparoscopy to that of therapeutic one. If no -we utilize anterior approach (Lichtenstein), taking like guidance the laparoscopic findings. The latter greatly facilitates anterior approach and avoids injuries of the main structures of inguinal canal.

Keywords: Re-recurrent inguinal hernia, Intra and Postoperative complications. Combined approach.

Introduction

Sir Astley Paston Cooper just at the dawn of hernia surgery wrote: "No disease of the human body, belonging to the province of the surgeon, requires in its treatment a better combination of accurate anatomical knowledge with surgical skill than hernia in all its varieties" {Sir Astley Paston Cooper, the Anatomy and Surgical Treatment of Inguinal and Congenital Hernia, Cox, London, 1804}. This statement is getting more important in case of recurrent hernias even for the experienced surgeon due to roughly distorted anatomy and difficulties in dissection. Regarding to that, an effective surgery for the re recurrent inguinal hernias – without exaggeration – is a real dilemma even sometimes unsolved issue, especially when due to rough adhesions (caused by previous mesh/meshes) the architectonics for both anterior and posterior dissection planes are drastically changed. The dilemma aggravates when a surgeon encounters long standing chronic infection around the previous mesh(es). The proportion of recurrent repairs in the total collective of inguinal hernia repairs among men is 11.3–14.3% and among women 7.0–7.4% [1]. The rate of re-recurrences is reported to be 2.9–9.2%. To date, no case series has been published on the second and third recurrences and their treatment outcomes. Only case reports are available. The guidelines of the HerniaSurge Group recommend that the first recurrence repair should be performed in an unoperated anatomic layer [1], i.e. laparo-endoscopic (TEP, TAPP) following previous open anterior repair and anterior open (Lichtenstein) following previous laparo-endoscopic repair. However, to date that recommendation is not adequately applied [3] and results in significantly higher rates of second recurrences [3]. The rates of second recurrences after recurrent inguinal hernia repair are reported in registry data and case series to be as high as 8.8% [4;5]. In meta-analyses comparing open with laparo-endoscopic repair of first inguinal hernia recurrences the rates of second recurrences were between 2.9% and 9.2% [6–9], depending on the follow-up time [2]. Based on the analysis of data from the Herniamed Registry [1], this paper now compares the treatment outcomes for different types of the second recurrences (depending of the dissection planes utilized) and with those of first recurrences.

Materials and Methods

We retrospectively studied (in the 2003-2023 period from 5 hospitals) elective 17342 inguinal hernia repairs (minimum age 18 years), of which recurrence was noted in 1720 (442 women, 1278 men) cases, which amounted to 9.9%. Out of recurrent 1720 cases, 138 (104 were men; 34 – women. M/F ratio – 3.05) or 8.02% had re recurrent inguinal hernias. 138 operations were performed due to re recurrent hernias, this number was divided into two groups A and B
Group A (82 patients): re-recurrence only after anterior (Basini + Lichtenstein; Shouldice + Lichtenstein; Lichtenstein + Lichtenstein) or only posterior (TAPP +TAPP; TEP+TAPP) approaches.
Group B (56 patients): re recurrence - after operations performed with anterior-posterior approaches (Basini + TAPP; Lichtenstein +TAPP; Lichtenstein + TEP; TAPP+Lichtenstein).
The main inclusion criteria in the both groups were minimum age of 16 years, unilateral second recurrent (re-recurrent) hernia after elective inguinal first recurrent hernia repair, using only the last recurrence per patient, all types of procedures, and availability of data at 1-year follow-up.
Mean operation time, intraoperative complications (bleeding, anatomical structure damage, tertiary recurrence, follow-up 1 year) and tertiary recurrences (follow-up 1 year) were studied in both groups and compared with a control C group.
Group C (control) was represented by only those 140 primary recurrent hernias (age >16 years) that did not develop a re recurrence -inclusion criterion (follow-up 1 year), from which 70 recurrent hernias developed after primary Lichtenstein and the other 70 - after primary TAP repairs. Those numbers were selected equally and randomly.
Quantitative values are presented as means \pm SD; qualitative values – by absolute values and percentages.
For quantitative indicators, comparison of mean values between groups was performed using One-Way ANOVA (for 3 groups) with post hoc test (Bonferroni Test).
For qualitative indicators, comparison between groups was performed using F criterion.
A difference was considered significant when $p < 0.05$.

FACTORS	GROUP A (82 PATIENTS)		GROUP B (56 PATIENTS)		GROUP C (140 PATIENTS)	
	A, n=82		B, n=56		C, n=140	
	n	%	n	%	n	%
Tobacco	75	91,46	32	57,14	82	58,57
Obesity	25	30,49	22	39,29	40	28,57
Alcohol	22	26,83	16	28,57	37	26,43
age >65	22	26,83	18	32,14	34	24,29
Diabetes	10	12,20	4	7,14	18	12,86
Immunosuppression	4	4,88	2	3,57	6	4,29
Connective tissue disease	4	4,88	2	3,57	2	1,43
Coagulopathy	4	4,88	2	3,57	8	5,71
Stroke	0	0,00	2	3,57	2	1,43
Myocardial infarction	6	7,32	4	7,14	16	11,43
Skin and soft tissue infection	6	7,32	4	7,14	10	7,14
Steroid treatment	6	7,32	4	7,14	8	5,71
Pain before surgery	14	17,07	8	14,29	30	21,43
COPD/Asthma	4	4,88	2	3,57	10	7,14

Table 1: Risk factors and concomitant diseases previous to surgery for re recurrent hernias in a and b groups and in control c group.

FACTORS	A-B		B-C		A-C	
	F	p	F	p	F	p
Tobacco	26,50	0,0000	0,03	0,8556	30,49	0,0000
Obesity	1,14	0,2876	2,12	0,1466	0,09	0,7633
Alcohol	0,05	0,8236	0,09	0,7617	0,00	0,9483
age >65	0,45	0,5029	1,26	0,2626	0,18	0,6753
Diabetes	0,92	0,3380	1,31	0,2545	0,02	0,8866
Immunosuppression	0,13	0,7141	0,05	0,8205	0,04	0,8382
Connective tissue disease	0,13	0,7141	0,91	0,3403	2,34	0,1272
Coagulopathy	0,13	0,7141	0,38	0,5404	0,07	0,7914
Stroke	2,99	0,0859	0,91	0,3403	1,18	0,2790
Myocardial infarction	0,00	0,9694	0,80	0,3731	0,97	0,3246
Skin and soft tissue infection	0,00	0,9694	0,00	1,0000	0,00	0,9616
Steroid treatment	0,00	0,9694	0,14	0,7080	0,22	0,6372
Pain before surgery	0,19	0,6633	1,30	0,2554	0,61	0,4343
COPD/Asthma	0,13	0,7141	0,88	0,3487	0,45	0,5050

No significant difference was found between groups A and B (except for tobacco).

Table 2: Statistical comparison of risk factors between the groups

COMPLICATIONS	GROUP A		GROUP B		GROUP C	
	A, n=82		B, n=56		C, n=140	
	n	%	n	%	n	%
Intraoperative bleeding	6	7,32	8	14,29	2	1,43

Intraoperative damage of the vas deferens and other structures	2	2,44	2	3,57	0	0,00
Infected mesh	8	9,76	6	10,71	4	2,86
Seroma	4	4,88	6	10,71	4	2,86
Postoperative wound infection	4	4,88	4	7,14	2	1,43
Need for drainage	4	4,88	6	10,71	2	1,43
Postoperative pain (1 year after surgery)	2	2,44	4	7,14	2	1,43
Third recurrence (within 1 year of the first surgery)	4	4,88	6	10,71	0	0,00

Table 3: Intra and postoperative complications in different groups

COMPLICATIONS	A-B		B-C		A-C	
	F	p	F	p	F	p
Intraoperative bleeding	1,77	0,1856	14,53	0,0002	5,24	0,0231
Intraoperative damage of the vas deferens and other structures	0,15	0,6995	5,13	0,0246	3,47	0,0639
Infected mesh	0,03	0,8560	5,18	0,0239	4,88	0,0283
Seroma	1,68	0,1968	5,18	0,0239	0,60	0,4378
Postoperative wound infection	0,31	0,5794	4,46	0,0360	2,34	0,1272
Need for drainage	1,68	0,1968	9,13	0,0029	2,34	0,1272
Postoperative pain (1 year after surgery)	1,77	0,1859	4,46	0,0360	0,30	0,5869
Third recurrence (within 1 year of the first surgery)	1,68	0,1968	16,63	0,0001	7,11	0,0082

Table 4: Statistical comparison of intra and postoperative complications in different groups

One-Way ANOVA Post Hoc Test

Bonferroni

Groups	N	Mean +SD	Minimum	Maximum	F	p
A	82	64,00±3,53	57,00	70,00	983,65	<0,0001
B	56	82,00±4,37	75,00	89,00		
C	140	54,00±4,11	46,00	62,00		
Total	278	62,59±11,40	46,00	89,00		

Multiple Comparisons (Bonferroni)

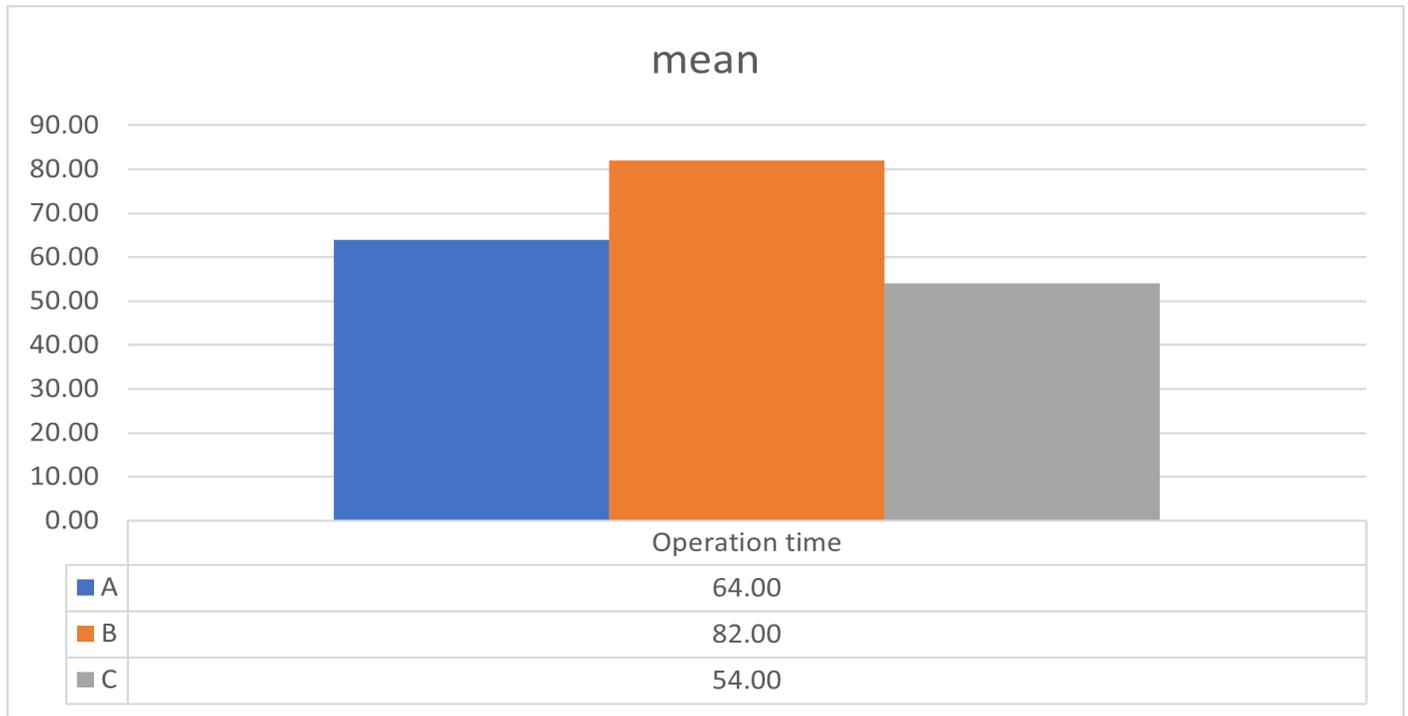
Groups		Mean Difference (I-J)	Std. Error	p
A	B	-18.00*	0,694	<0,0001
	C	10.00*	,55725	<0,0001
B	A	18.00*	,69468	<0,0001
	C	28.00*	,63360	<0,0001

C	A	-10.00*	,55725	<0,0001
	B	-28.00*	,63360	<0,0001

Table 5: Mean operation time in different groups

*. The mean difference is significant at the 0.05 level.

The Mean operation time is significantly longer in group B compared to group A and group C, and significantly longer in group A compared to group C.



In group B, compared to group C, there was a significantly higher incidence of: intraoperative bleeding, intraoperative damage to the vas deferens and other structures, infected mesh, seroma, postoperative wound infection, need for drainage, postoperative pain (1 year after surgery), tertiary recurrence (within 1 year of the first surgery).

In group A, the incidence of intraoperative bleeding and tertiary recurrence was significantly higher than in group C. In group C, there was no: tertiary recurrence, intraoperative damage to the vas deferens and other structures, infection of the skin and soft tissues. Group B was the most difficult group, dealing with significantly altered anatomy of both the anterior and posterior walls of the inguinal canal. We mainly focused on this group, since this is where the so-called combined approach was used, in particular, we started the operation with a laparoscopic revision of the abdominal cavity, and in case of significant anatomical changes in the back space and rough healing developed around the prosthetic material, we switched to the open method (anterior approach – Lichtenshtein). As for group A, here the principle of treatment was no different from the principle of treatment of primary recurrent hernia (guideline, Herniamed registry), where, despite the secondary recurrence, we had an anatomically unchanged space from which we carried out the approach.

RE-RECURRENCE AFTER	PREVIOUS OPERATIONS (PROCEDURE TYPES)	NUMBER OF PATIENTS	OPERATION FOR RE-RECURRENT HERNIA (PROCEDURE TYPES)
GROUP A			
DOUBLE ANTERIOR REPAIR	a. BASSINI+LICHTENSHEIN	6	TAPP
	b. SHOULDICE + LICHTENSHEIN	12	TAPP
	c. LICHTENSHEIN+LICHTENSHEIN	42	TAPP+TEP
DOUBLE POSTERIOR REPAIR	a. TEP+TAPP	6	LICHTENSHEIN
	b. TAPP+TAPP	16	
GROUP B			
ANTERIOR-POSTERIOR REPAIR	a. BASSINI+TAPP	4	COMBINED APPROACH FINALIZING WITH: a. TAPP b. LICHTENSHEIN
	b. LICHTENSHEIN +TAPP	34	
	c. LICHTENSHEIN +TEP	6	
	d. SHOULDICE + TAPP	12	
GROUP C			
CONTROL	a. LICHTENSHEIN	70	TAPP/TEPP
	b. TAPP/TEPP	70	LICHTENSHEIN

Table 3: types of previous and final surgeries per each group.

Discussion

Recurrent inguinal hernia surgery poses a real challenge even for experienced surgeons in hernia or referral centers. This issue still remains debatable, since there are a number of surgeons who are better versed in laparoscopic or open techniques and for them, naturally, in the conditions of the changed anatomy of the operated groin, it is better to implement the technique that is better suited to them [10,11]. In this regard, we fully support the Danish Hernia Database [4], according to which a repeated approach is recommended for recurrent hernias from an intact plane. We have extended this approach to cases when the first and repeated operations were performed from the same plane and we had a so-called intact plane [3]. In our opinion, a certain innovation is the use of the so-called hybrid approach for cases when both planes are used during in the previous operations. Based on our experience as from a few reports in the modern literature sometimes very individual solutions are necessary to treat a re-recurrent hernia [12]. The essence of this method is to select the least damaged plane by diagnostic laparoscopic revision of the posterior plane and then decide whether the anterior or posterior plane should be selected for the main surgical intervention. As our study shows, this approach prolongs the operation time, but significantly improves the postoperative complication rates and long-term outcomes.

Conclusion

A reliable difference was noted among B group and A and control groups. As for the surgical treatment of re-recurrent hernias, there is an obvious difference with the (reliable) control and first and second groups, in particular, there are high rates of operative time, intra- and postoperative complications. It is our opinion that a combined approach should be used in such cases and it should be performed in a hernia referral center and/or by a highly experienced surgeon.

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