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Quality of Life Changes after Inguinal Hernia Repair Using Anterior Rectus Sheath – A Preliminary Study

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A B S T R A C T

Chronic pain is the most serious long-term complication after groin hernia repair. The aim of this preliminary research was to assess the quality of life before and after standard tension-free mesh repair and new method of tension-free inguinal hernia repair using anterior rectus sheath. Total of 62 patients were evaluated. Anterior rectus sheath method was performed in 29 patients and in 33 patients standard mesh repair was used (Lichtenstein repair). Quality of life was assessed before and after the surgery using short-form SF-36 questionnaire (QualityMetric Inc.), adjusted for Croatian language. There were statistically significant improvements in bodily pain and general health scores in both groups. Patients operated using mesh technique also demonstrated statistically significant improvements in social functioning and emotional role. Similarly, patients in whom inguinal hernia was repaired using anterior rectus sheath had significantly better postoperative scores for physical functioning and role physical scores. Quality of life assessment demonstrated good ability to differentiate between several independent aspects of quality of life. Anterior rectus sheath repair significantly improved quality of life and was shown to be similar to mesh repair in the aspect of physical functioning.

Key words: *quality of life, inguinal hernia, SF-36, surgical flaps, surgical meshes*

Introduction

Inguinal hernia represents a major health problem in the world. Pure tissue repairs utilize patient's own tissue for the reinforcement of the floor of the inguinal canal. These presumably healthy adjacent tissues are pulled or overlapped over the weakened tissue of the floor of the inguinal canal, thus inevitably creating tension on the suture line and increasing the risk of recurrence. Tension free techniques utilizing prosthetic meshes have been introduced over 40 years ago to decrease tissue tension and reduce recurrences. Since then, tension-free methods utilizing prosthetic meshes have been increasingly accepted in hernia repair in general, as a reliable means for reinforcing the floor of the inguinal canal with very low recurrence rate, bellow 1% in most reports.

Chronic pain is the most serious long-term complication that can occur after repair of a groin hernia. The frequency of chronic pain has been reported to be as high as 30–54% in patients undergoing open inguinal hernia repair. It has been found that chronic pain significantly affects patients' daily activities and quality of life in general.

Recently, several reports have investigated short term results of another tension-free method of inguinal hernia repair, utilizing a flap of the anterior sheath of rectus abdominis muscle. Although these studies reported good results, no reports were found investigating the quality of life of patients in whom inguinal hernia was repaired using anterior sheath of rectus abdominis muscle.

The aim of this preliminary research was to assess the quality of life before and after standard tension-free mesh repair and new method of tension-free inguinal hernia repair using anterior rectus sheath.

Materials and Methods

Total of 62 patients (53 men and 9 women) operated for inguinal hernias by the same surgeon (M.H.) between

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2000 and 2003 were evaluated. Mean age of all operated patients was 56.3 (SD 15.6) years.

Anterior rectus sheath method was performed in 29 patients and in 33 patients standard mesh repair was used (Lichtenstein repair). Patients were randomly allocated to one of the two treatments (mesh repair or anterior rectus sheath repair). In all procedures, iliohypogastric nerve was identified and preserved.

Standard Lichtenstein repair was performed as described by the author, and the sac was dissected to the level of the internal inguinal ring, ligated and resected. Subsequently, polypropylene mesh was placed on the floor of the inguinal canal, taking care that it is not too flat to avoid tension after fixation. Mesh was anchored with interrupted sutures, avoiding trauma to the periosteum and placing the spermatic cord above the mesh. Aponeurosis of the external oblique muscle was closed above the cord.

The technique of anterior rectus sheath method consisted of standard inguinal approach, sac preparation and dissection. Using blunt dissection in avascular plane, anterior sheath of the ipsilateral rectus abdominis muscle was exposed. Arcuate incision of the anterior rectus sheath was made to mirror the shape of the inguinal ligament. Flap was created by blunt dissection of the lateral part of the anterior rectus sheath from the muscle. The flap was then overlapped laterally, over the floor of the inguinal canal and sutured to the inguinal ligament by continuous suture. The cord was placed over the reinforced floor of the inguinal canal, and the aponeurosis of the external oblique muscle was sutured over the cord with interrupted sutures.

Quality of life was assessed before surgery and during follow up using short-form 36 (SF-36) questionnaire (QualityMetric Inc.), designed and evaluated for Croatian language. At follow up, patients were examined for recurrences. All eight parameters of quality of life were calculated and evaluated. In addition, reported health parameter was assessed, reflecting patients overall health status. Postoperative quality of life and examination for recurrences were performed again after 7 months. Examinations for recurrences were performed yearly. Mean follow-up time for all patients was 41 months (range 19–65).

This study was in accordance with the ethical standards of the local ethics committee as well as with the Helsinki Declaration of the World Medical Association.

Statistical analysis was performed using non-parametric Wilcoxon's matched pair test to compare preoperative and postoperative quality of life results. Mann-Whitney U-test was employed for comparisons of postoperative to preoperative score ratios between two independent groups. The level of $p<0.05$ was considered statistically significant.

Results

Improvements in all eight aspects of quality of life have been observed in patients undergoing standard mesh tension-free hernia repair (Figure 1, Table1). Bodily pain score increased after surgery indicating statistically significant improvement (reduction) in bodily pain. Patients in whom standard mesh repair was performed also had statistically significant improvement in general health score. Statistically significant improvements were observed in both social functioning and role emotional scores.

Similarly, improvements were observed for almost all aspects of quality of life in patients undergoing the method of tension-free hernia repair utilizing anterior rectus sheath (Figure 2, Table 1). Improvements in physical functioning, role physical, bodily pain and general health were statistically significant after surgery.

Comparison of postoperative to preoperative ratios of scores did not reveal statistically significant changes in either of eight measured aspects of quality of life ($p> 0.05$, Table 2).

Discussion

Chronic pain is the most serious long-term complication that can occur after repair of a groin hernia. It is a well recognized condition with the frequency reported to be as high as 54%. Chronic pain after inguinal hernia surgery has a great impact on the quality of life of these patients.

Definitely, one of the most important achievements in modern medicine is the recognition of the importance of subjective accounts of health, described through quality of life, as being one of the major treatment end-points. In most clinical trials nowadays, as well as in clinical practice, quality of life is more and more becoming a standard measure of outcomes. So far, patients' perceptions and goals for improvement after treatment are not sufficiently standardized. Furthermore, one should expect different relative importance for different quality of life domains, due to subjective variations. Quality of life is a multi-dimensional by nature and is comprised of several independent domains such as physical health, social functioning, mental health etc. One of the instruments that is most widely used to measure general, rather than specific disorder-related quality of life is SF-36 health-survey questionnaire.

In spite the fact that there are numerous surgical techniques for inguinal hernia repair, few studies investigated impact of specific techniques on the quality of life.

Most accepted surgical techniques for inguinal hernia repair today utilize prosthetic meshes to increase the strength of the floor of the inguinal canal. These techniques are characterized by the avoidance of tissue tension that is common in classical, pure tissue repair. Tension at the suture line is believed to be associated with recurrence as well as postoperative discomfort. Introduction and wide acceptance of prosthetic meshes in ingui-

TABLE 1
RESULTS OF QUALITY OF LIFE MEASURING WITH SHORT FORM 36 QUESTIONNAIRE AMONG PATIENTS OPERATED FOR INGUINAL HERNIA USING STANDARD MESH REPAIR OR ANTERIOR RECTUS SHEATH REPAIR

	Standard mesh repair					Anterior rectus sheath repair				
	Preoperative score		Postoperative score		p-level	Preoperative score		Postoperative score		p-level
	Median	Range	Median	Range		Median	Range	Median	Range	
Physical functioning	72.5	0–100	77.5	35–100	0.181	60	0–100	80	45–100	0.016
Role-physical	50	0–100	100	0–100	0.114	25	0–100	100	0–100	0.016
Bodily pain	41	0–100	84	31–100	0.004	41	12–100	74	31–100	0.0009
General Health	45	25–100	59	40–100	0.015	55	25–87	62	35–100	0.006
Vitality	50	50–90	65	20–100	0.146	55	30–100	60	35–100	0.772
Social functioning	62.5	25–100	87.5	37.5–100	0.039	75	25–100	75	37.5–100	0.343
Role-emotional	33.3	0–100	100	0–100	0.016	33.3	0–100	66.7	0–100	0.371
Mental Health	52	24–96	72	36–96	0.118	68	36–96	76	44–100	0.052

TABLE 2
COMPARISON OF POSTOPERATIVE TO PREOPERATIVE RATIOS OF EIGHT ASPECTS OF QUALITY OF LIFE MEASURED WITH SHORT FORM 36 QUESTIONNAIRE AMONG PATIENTS OPERATED FOR INGUINAL HERNIA USING STANDARD MESH REPAIR OR ANTERIOR RECTUS SHEATH REPAIR

	Standard mesh repair			Anterior rectus sheath repair			
	Median	Minimum	Maximum	Median	Minimum	Maximum	p-level
Physical functioning	1.000	0.571	10.000	1.298	0.769	4.500	0.129
Role-physical	1.000	0.250	2.000	1.167	0.500	4.000	0.114
Bodily pain	1.382	0.756	8.333	1.909	1.000	4.545	0.563
General Health	1.192	0.912	2.857	1.149	0.783	2.280	0.637
Vitality	1.083	0.400	6.000	1.000	0.750	2.667	0.116
Social functioning	1.200	0.750	3.500	1.000	0.600	3.000	0.363
Role-emotional	1.000	0.000	3.000	1.000	0.667	3.000	0.237
Mental Health	1.188	0.846	3.333	1.071	0.765	2.300	0.265

nal hernia repair was followed by significant reduction of recurrence rates, from 15–30% down to 1.2–7%. Thus, tension free concept in inguinal hernia repair remains the key factor in reducing postoperative discomfort, pain and recurrence.

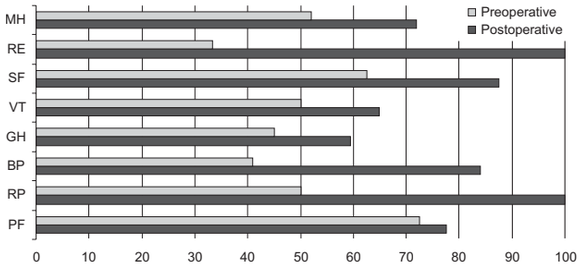

Fig. 1. Changes in median values of eight aspects of quality of life measured before and after surgery with Short form (SF-36) questionnaire among patients operated for inguinal hernia using mesh tension-free repair. MH – mental health, RE – role-emotional, SF – social functioning, VT – vitality, GH – general health, BP – bodily pain, RP – role-physical, PF – physical functioning.

Inguinal hernia repair using the flap of the rectus abdominis muscle to strengthen the floor of the inguinal canal is tension-free repair that requires no foreign material. Thus, some potentially negative characteristics of meshes are avoided. These are primarily foreign body reaction, with possibility of subsequent nerve entrapping and pain, and increased discomfort due to the mesh.

The disadvantage of anterior rectus sheath in inguinal hernia repair is weakening of the anterior abdominal wall, since posterior sheath of the rectus abdominis muscle is joined with anterior sheath below the semilunar line. This renders this area of the abdominal wall weaker and more prone to hernia formation. Such hernias occurring in the area just lateral to the rectus abdominis muscle and below the semilunar line have been called Spigelian hernias. Frequency of Spigelian hernia in general population is low, and this type of hernia comprises less that 2% of all hernias. However, true impact of Spigelian hernia formation in patients who underwent hernia repair using anterior rectus abdominis flap is still under evaluation. Some reports indicate that majority of recurrences after anterior rectus sheath repair are of Spigelian type.

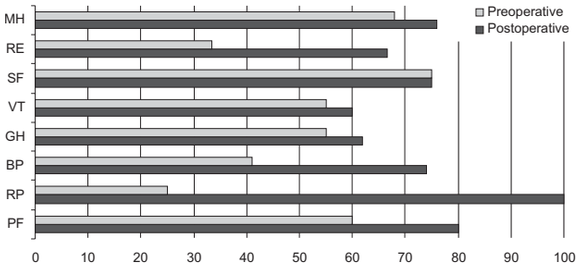

Fig. 2. Changes in median values of eight aspects of quality of life measured before and after surgery with Short form (SF-36) questionnaire among patients operated for inguinal hernia using new method of tension-free repair with anterior rectus sheath flap. MH – mental health, RE – role-emotional, SF – social functioning, VT – vitality, GH – general health, BP – bodily pain, RP – role-physical, PF – physical functioning.

This is the first study evaluating long-term results of a relatively unknown method of inguinal hernia repair that has some potential benefits over classical mesh repair.

In both groups of patients there was improvement in all eight aspects of quality of life after surgery as measured with SF-36 questionnaires. The results of this study demonstrated statistically significant improvements in bodily pain and general health scores using SF-36 questionnaire in both groups of patients. Patients operated using mesh technique also demonstrated statistically significant improvements in social functioning and emotional role. Similarly, patients in whom inguinal hernia was repaired using anterior sheath of rectus abdominis muscle had significantly better postoperative scores for physical functioning and role physical scores.

The introduction of measurement of quality of life, as the instrument for assessing patients' satisfaction with undertaken treatment, demonstrated a good ability to differentiate between several independent aspects of quality of life in this study. Although significant improvements in bodily pain and general health domains observed after surgery clearly demonstrate the usefulness of hernia surgery in general, more pronounced improvements in physical functioning and role physical domains may reflect patients' perception of foreign material implants (mesh), which is in accordance with previously published studies.

Although this is the first study to compare the quality of life in patients undergoing anterior rectus sheath repair for inguinal hernia, the number of participants is rather limited. This is due to the fact that anterior rectus sheath flap is still not generally accepted for inguinal hernia repair, which requires that only results of a single surgeon are evaluated to eliminate potential confounding factors, therefore, the results given herein are the preliminary results of an ongoing clinical study.

In this study, anterior rectus sheath repair for inguinal hernia demonstrated good results and significantly improved quality of life after surgery. Compared to standard mesh techniques, anterior rectus sheath repair was shown to be similar in the aspect of physical functioning of operated patients. Further research is required to evaluate the impact of anterior rectus sheath repair on quality of life.

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PROMJENE KVALITETE ŽIVOTA NAKON OPERACIJSKOG LIJEČENJA PREPONSKE KILE KORIŠTENJEM PREDNJE OVOJNICE RAVNOG TRBUŠNOG MIŠIĆA – PRELIMINARNA STUDIJA

S A Ž E T A K

Kronična bol je najozbiljnija dugoročna komplikacija nakon operacije preponske kile. Cilj ovog preliminarnog istraživanja je procijeniti kvalitetu života prije i nakon standardne »tension-free« hernioplastike uz pomoć mrežice i nove »tension-free« hernioplastike uz pomoć prednje ovojnice rektusa. U istraživanje su bila uključena 62 pacijenta. Metoda uz pomoć prednje ovojnice rektusa primijenjena je kod 29 pacijenata, a standardna metoda hernioplastike uz pomoć mrežice (tzv. Lichenstein) kod 33 pacijenta. Kvaliteta života ispitivana je prije i nakon operacije putem SF-36 upitnika (QualityMetric Inc.), prevedenim na hrvatski. Statistički značajno poboljšanje tjelesne boli i općeg stanja uočeno je u objema grupama. Pacijenti koji su podvrgnuti hernioplastici uz pomoć mrežice pokazali su statistički značajno poboljšanje u društevnom funkcioniranju i emocionalnom aspektu. Slično tome, pacijenti koji su operirani upotrebom prednje ovojnice rektusa, pokazali su značajno bolje postoperativne rezultate u fizičkoj spremi i fizičkom funkcioniranju. Procjena kvalitete života pokazala se izuzetno kvalitetnom u razlikovanju nekoliko nezavisnih aspekata kvalitete života. Upotreba prednje ovojnice rektusa u hernioplastici značajno je poboljšala kvalitetu života, a u fizičkom aspektu kvalitete života dala je slične rezultate kao i standardna hernioplastika uz pomoć mrežice.