

Use of Synthetic Protetic Materials in Surgical Abdominal Defects

Analysis of the Advantages and Lack of the Liechtenstein Method

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Liechtenstein procedure represents the most frequent technique used for surgical abdominal interventions. Although, it is a modern and inovative procedure, it still has a relative risk for complications. A number of 93 subjects were included in our research. We develop our study in General Surgery Department of County Emergency Hospital of Craiova, Romania between 1st July 2017-31th March 2018. From the total of 93 patients, 88% were men. Most of subjects had ages between 70 and 79 years old, were operated by Liechtenstein technique and they were coming from quite equal percent from rural and urban areas. The incidence for complications (seroma, hematoma, infection, abscess) was generally lower for the patients diagnosticated with Liechtenstein procedure comparing with the subjects operated by other technique. Liechtenstein procedure is recommended especially for its simplicity and efficiency, reproducibility and safety. It is very important to choose the perfect synthetic prosthetic material to have a good evolution of the disorder and a small recurrence rate.

Keywords: *Liechtenstein procedure, synthetic materials, abdominal surgery*

All over the world, in abdominal surgery are used many kinds of biomaterials highlighting that is quite impossible to say if there exists a perfect material for suturing the abdominal defect. The large variety of biomaterials used in abdominal surgery and the multitude of surgical fixation procedures show that we are still far from the ideal prosthetic materials [1].

Nowadays, the surgically interventions of hernia are correlated with the application of the meshes, so it is quite difficult to imagine hernia surgery without these type of synthetic biomaterials [2].

One of the most important and significant moment in the evolution of procedures used in hernia-surgery was the introduction of the Liechtenstein technique more than 30 years ago, described by a modern technique using a polypropylene prosthetic mesh, with local anesthesia and a low hospitalization period [3].

But, as we can see, a perfect solution for an ideal synthetic biomaterial still represents a dream, very difficult to find and to apply in clinical practice.

Biochemical tests can help the clinicians to diagnosticate earlier the complications during the postoperative course after the abdominal surgery with synthetic biomaterials [4, 5].

So, we consider that a complex biochemical examination it is very important in order to have a better evaluation that could help us to fix a correct diagnosis and

to find as early as possible the complications after surgical interventions.

If we take a look over the gender distribution we can see that more than 70% of the patients diagnosticated with inguinal hernia are represented by men, so we consider that gender is an important social and etiological factor. More than that is considered that worldwide around 4% of the men could develop inguinal hernia during their lifetime [6].

Regarding possible complications, although the modern synthetic biomaterials are considered inert and compatible, prosthetic materials are responsible in many cases of local inflammation function of their structure and also of their composition [7, 8].

A great part of the surgeons consider that the combination between Liechtenstein repair and herniorrhaphy would be the best procedure to treat inguinal hernia, these combined interventions have a very low incidence of postoperative complications [9].

Although, Liechtenstein technique represents one the most used method with a low incidence of side effects, the most important complications in Liechtenstein hernioplasty are represented by infections and recurrences [3].

Early physical exercises and many somatic comorbidities like mellitus diabetes, malignancies, renal diseases, cardio-vascular or pulmonary disorders can induce early postoperative complications, so it is very

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important to have a better collaboration between doctors from different departments in order to prevent and to cure possible postoperative medical problems [10, 11].

We desire to realize a study where we are trying to evaluate the advantages and the disadvantages of the Liechtenstein procedure at the patients diagnosticated with inguinal hernia and other surgical abdominal defects.

Experimental part

Material and methods

Our scientific research was develop on a period of 9 months between 1st July 2017-31th March 2018 in Clinical Emergency County Hospital of Craiova, Romania.

We studied a group of 93 patients diagnosticated with different type of abdominal defects and hospitalized in General Surgery Department. We divided these patients in two groups: in one we used Lichtenstein procedure and in the second group we used other surgical techniques. For all the patients operated by Liechtenstein mood we used polypropylene synthetic mesh like ProMesh or Biosintex 7 x 5 cm and the suture were done by propylene 2.0. It was realized the incision of the inguinal ligament, than the mobilization of the seminal funicular. The next step was to open the inguinal canal in order to find the hernial sack. We opened the hernial sack and we empty it. Then, we applied the propylene mesh, repaired the inguinal canal and sutured on the levels of the plague.

Our subjects benefited of complex general and surgical evaluation included clinical and biochemical procedures. So, we included in our research medical dates like: the type of surgical procedures, the kind of synthetic biomaterial used in the intervention and the number of hospitalization days. Werealized also a couple of paraclinically examinations like: haemoglobin, transaminases, bilirubine, proteins, glucose, the thrombocytes number, creatinine, the values of Na⁺ and K⁺ etc. Also, we retained socio-demographics informations of the patients like: age, gender, environmental area, and other risk factors.

The main aim of our research is to evaluate the couple of advantages and the eventually problems of using Liechtenstein surgical procedure in inguinal hernia repair. If it is possible we proposed also to fix some correlations between the type of hernia and the surgical intervention, between the type of hernia and the type of the synthetic biomaterial used in the surgery theater and also to establish connections between biochemical parameter and the type of surgical intervention.

Results and discussions

We included in our study a number of 93 patients diagnosticated with different type of abdominal defects.

The distribution by gender reveals that most of the people were men (81 men vs 11 women). This high percent, around 88% demonstrate that the men are more affected by hernia and other abdominal defects comparing with women. These dates are correlated with the information from literature.

We studied the patients by the environmental areas and we obtained a quite equal percent between people from rural and urban areas. Here results are not very concluding, so we cannot realize a direct correlation between geographic areas and the surgical diagnostic. But we consider that a high level of education and a good

Gender	No.
Women	11
Men	81
Total	92

Table 1
GENDER DISTRIBUTION
OF THE PATIENTS

Age	18-29	30-39	40-49	50-59	60-69	70-79	>80
No.	12	8	7	15	15	22	12

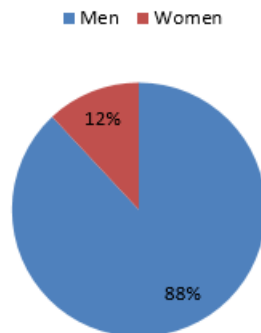


Fig. 1. Gender distribution

information could improve the evolution and the prognosis of the medical disease.

Urban/Rural	Total
Rural	47
Urban	45
Total	92

Table 2
ENVIRONMENTAL
DISTRIBUTION

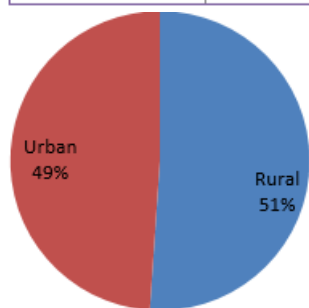


Fig. 2. Environmental distribution

We realized a statistic about the age of the patients included in our study, to analyze which age group is associated with the higher incidence for hernia and other surgical defects.

As we can see from the following chart, the most people diagnosticated with abdominal defect were between 70 and 79 years old. We consider that the age is very important to establish some correlation with the risk of medical and surgical disorders and our research prove one more time that the elderly is associated with many medical problems and with high risk of disease.

The period of hospitalization is a difficult period involving many medical, personal and social problems. The desire of any medical practitioner is to discharge the patient in the best condition and in the shortest time as it is possible. As we can see from the chart, the majority of the subjects included in our study presented between one and 5 days of hospitalization.

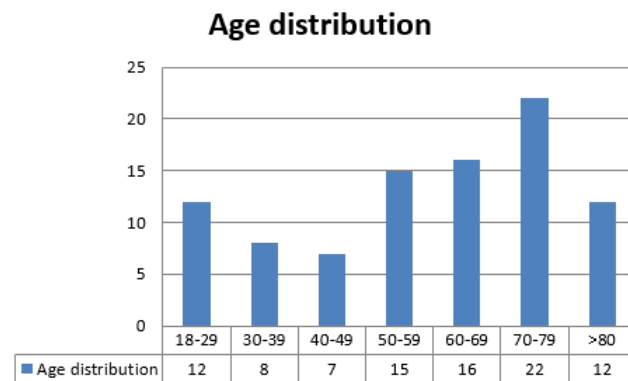


Fig. 3. The age distribution of the subjects

Table 3
AGE DISTRIBUTION

Age	18-29	30-39	40-49	50-59	60-69	70-79	>80
No.	12	8	7	15	15	22	12

Hospitalization days	1-5	6-10	>10
Total	57	31	4

Table 4
HOSPITALIZATION DAYS DISTRIBUTION

Hospitalization days

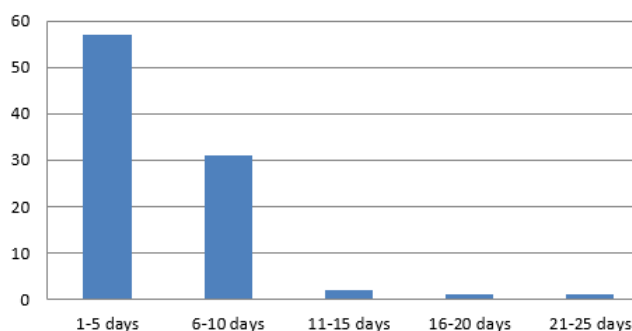


Fig. 4. Hospitalization days distribution

We can see from the next chart that most of the subjects were operated by the surgeons using Liechtenstein technique and we can say that the small number of the days can be correlated with the surgical procedure.

Surgical technique	
Liechtenstein	69
Other technique	23

Table 5
SURGICAL TECHNIQUE

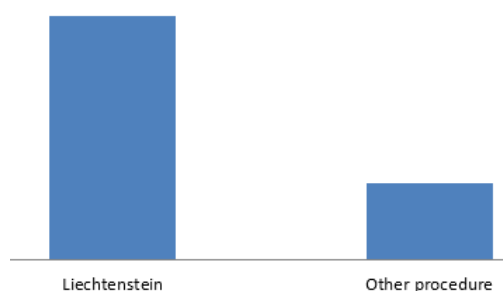


Fig.5 Surgical technique

We wanted to research the post-surgical infection on the patients operated by Liechtenstein method comparing with other surgical procedures.

On the whole group of subjects we registered a percentage of 11%, representing 10 patients develop infection. (p test Fisher=0.4416)

Table 6
THE INCIDENCE OF THE INFECTIONS

Surgical technique	Infection	No infection	Total
Liechtenstein	9	60	69
Other surgical technique	1	22	23
Total	10	82	92

infection

■ infection ■ non-infection

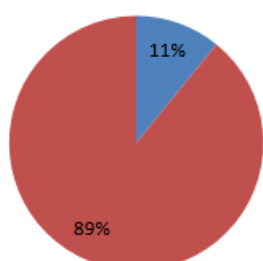


Fig.6 The incidence of the infections for all the patients included in our study

Liechtenstein

■ infection ■ non infection

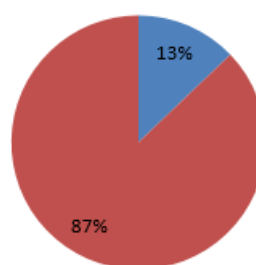


Fig. 7. The incidence of the patients for Liechtenstein technique

other technique

■ infection ■ non infection

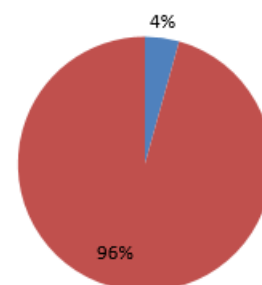


Fig. 8. The incidence of infections for the patients with other surgical technique

From the patients operated using Liechtenstein technique a number of 9 patients, representing 13% presented infection after surgical intervention.

On the other hand, only one patient operated by other surgical procedure had infection after intervention. We can observe a higher number of infected patients after Liechtenstein procedure.

Other possible complication after is represented by the formation of abscess after surgical intervention. From this point of view we can see that a number of 7 patients (8%) presented abscess after intervention.

Table 7
THE INCIDENCE OF THE ABSCESS FOR ALL THE PATIENTS INCLUDED IN OUR STUDY

Surgical technique	Abscess	No abscess	Total
Liechtenstein	0	69	69
Other technique	1	22	23
Total	1	91	92

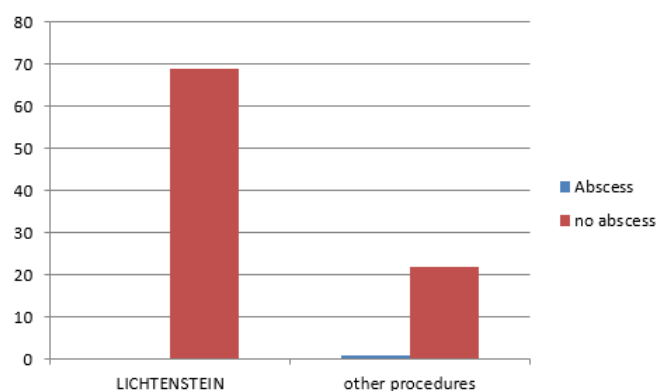


Fig. 9. The incidence of abscess for all the patients included in our study

We registered one case of abscess formation at the patients operated using a surgical procedure but Liechtenstein. At the patients at whom was used Liechtenstein technique were no case with abscess.

We found 10 cases of seroma formation after intervention at the patients included in our research. From these, around 35% represented patients operated using Liechtenstein procedure. Rest of cases, were represented by patients operated with other surgical procedures.

pFischer=0.0141-this show us a more significant percent for the patients with other surgical techniques.

Speaking about hematoma, around 8% subjects develop hematoma after surgical intervention. More of 50% presented hematoma after Liechtenstein intervention. (pFischer=0.3607.)

Table 8
THE INCIDENCE OF SEROMA FOR ALL THE SUBJECTS INCLUDED
IN STUDY

Surgical technique	Seroma	No seroma	Total
Liechtenstein	4	65	69
Other surgical technique	6	17	23
Total	10	82	92

seroma

■ serom ■ non seroma

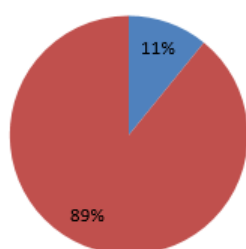


Fig. 10. The incidence of seroma for all the patients included in our study

We can observed that the patients operated by Liechtenstein procedure included in our study presented

Tabel 9
THE INCIDENCE OF HEMATOMA FOR ALL THE PATIENTS INCLUDED
IN STUDY(pFischer=0.3607.)

Surgical intervention	Hematoma	No hematoma	Total
Liechtenstein	4	65	69
Other surgical technique	3	20	23
Total	7	85	92

hematoma

■ hematoma ■ non hematoma

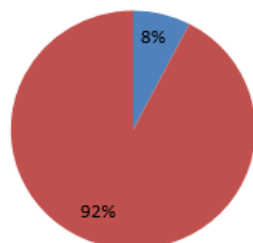


Fig. 11.The incidence of hematoma for all the patients included in our study

less complications comparing with the patients operated by other technique. These result are correlated with the literature data, which describe a lower incidence of seroma, chronic pain or recurrence of hernia [12, 13].

Conclusions

Liechtenstein technique represents the most used procedure for the inguinal hernia. It is recommended especially for its simplicity and efficiency, reproductibility and safety. The incidence for hernia recurrences is very low and the cases in which patient develop seroma are rare. The patients can be discharge very quickly and they use to have a good socio-professional reintegration.

It is still recommended to pay attention to the possibility of infection and to the risk of hematoma and for that it is very important to choose the best synthetic prosthetic material for a best therapeutic answer.

A suitable synthetic material decreases the risk of complication before and after surgical intervention.

Nevertheless, we have to take care about the quality life of our patients, because it is well-known that the psychological stress could alterate the evolution of the medical conditions [12].

We don't have to forget that there is a correlation between stress, psychiatric diseases and arrhythmic risk [14]. So, it is very important to have an exhaustive vision of the patients and to try to improve their life quality.

Nevertheless, it is very important to follow the weight of the patients and to evaluate the risk of obesity, because adipose tissue represents a huge endocrine organe with many metabolic and inflammatory effects [15].

In conclusion, the suitable choice for the technique and for the surgical material is one of the most important part of our surgical intervention.

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