

Clinical and Biochemical Comorbidities and Complications in Abdominal Surgery Using Synthetic Prosthetic Material

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Hernia can be defined as an organ disorder which protrudes the wall that contains it. Synthetic material for the repair of the abdominal wall are used frequently with good results and less complications. Our research included a number of 135 patients diagnosed with inguinal hernia hospitalized and operated in Clinical County Hospital of Craiova, between 1st January 2017-31 October 2017. The purpose of our work was to identify and analyze comorbidities and complications for inguinal hernia repaired with synthetic prosthetic material. hernia repair was performed in 135 patients, 16 were women and 119 were men. Tension free meshplasty was accomplished in 131 patients with uncomplicated inguinal hernia and herniorrhaphy was successfully performed at 4 patients with complicated inguinal hernia. From our study 107 patients had a remarkable recovery without any complication. Patients who underwent tension-free hernia surgery using prosthetic mesh, short-term complications were represented by 19 patients with urinary retention, 6 surgical local infection (superficial infections) and 2 scrotal edema. Nowadays surgeons try to find the best elective repair of inguinal hernia, to be safety for the patients despite of their age and with few complications and low mortality rate. Risks assessment include general conditions and associated comorbidities of the patients. In our study we reveal the type of comorbidities which we meet. We considered that it is significant to optimize cardiopulmonary status and the other comorbidities of the patient before to repair abdominal wall hernia in order to avoid both short and long term complication.

Keywords: inguinal hernia, complication, comorbidities

The certain treatment of all hernias despite the origin or type, is the surgical repair [1]. More than 20 million inguinal or femoral hernias are operated annually worldwide [2].

Hernia is known as a condition of an organ or a part of an organ which is displaced and protrudes through the wall that normally containing it. Inguinal and femoral hernias are defined as groin hernias. Inguinal hernia is more frequently than the femoral, umbilical or epigastric hernias, however femoral hernias is known to present more complication than other abdominal wall hernia [3].

For the majority of the cases, surgical repair for groin hernias can be accomplish with minimal risk at patients with severe postoperative complications. However, minor surgical complications continue to exist, mainly for those who follow open hernia repairs [4].

The most suitable treatment of abdominal wall hernia should be well defined and has to be less traumatic regarding the technique, the type of anesthesia, the costs and not least according to the comorbidities [5, 6].

For hernia repair are well known many techniques, but tension free technique has a remarkable use from many years with spectacular results, low rate of recurrences and low rates of postoperative morbidity [7].

Nowadays the use of synthetic material such as polyester, polypropylene, polytetrafluoroethylene etc, for abdominal wall repair, are used frequently with exceptional results. Using synthetic material in a tension free technique has significant result in postoperative recurrences [8].

Polyester has important strength and is a flexible material, but it can lead to formation of a fistula, recurrence of hernia and different type of postoperative infections and degradation of the tissue in a long-term implantation [9, 10].

Polypropylene has an exceptional chemical resistance, a great elasticity and toughness and a low predisposition to mesh infections, but it can lead to adhesion of viscera when is placed intraperitoneally [11, 12].

Expanded polytetrafluoroethylene (ePTFE) has high biocompatibility, low tissue reactivity and a lower adhesion score than polypropylene.

Risk factors that are frequently associate with abdominal wall hernia include old age, coexisting medical illness and the work activity.

The majority of the elderly patients which need an abdominal wall hernia repair, are known with associate comorbidities. There are many studies which demonstrate

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that old age increase of many fold the risk of morbidity and mortality [13].

Experimental part

Material and methods

We performed a study of 135 patients diagnosed with inguinal hernia in Clinical County Hospital of Craiova, between 1st January 2017-31 October 2017.

Our study aims to identify and analyze the comorbidities and the complications for inguinal hernia, using synthetic prosthetic material.

Before intervention we did a preoperative check-up. Biochemical tests were made to all patients with hernia: blood count, blood glucose, liver tests (alanine transaminase - ALT, aspartate aminotransferase - AST), kidney tests (serum creatinine, urea). Imaging test and ultrasounds determined the exact size of the abdominal defect and allow us to determine which is the best surgery therapy. Informed consent form was signed by all participant of our study. We explain to every patient in part every surgery technique and the possible complication associated with the intervention we choose.

After approval by the Hospital Ethics Committee and written consent, 135 patients of different age, sex, diagnosed with inguinal hernia were included in our study.

The anesthetist determined the anesthesia employed to each of our patients, after assessing the risk of the intervention. All patients underwent inguinal hernia repair using techniques like tension-free meshplasty, hernioplasty for uncomplicated inguinal hernia and herniorrhaphy for patients with complicated inguinal hernia.

Follow-up controls have been made at six weeks, three and six months post-intervention.

The variables we use in our study were patient demographics (gender, age), urban and rural environment, type of inguinal hernia (direct or indirect, complicated or uncomplicated), type of comorbidities, type of anesthesia and postoperative complication.

Results and discussions

Inguinal hernia repair was performed in 135 patients, 16 were women and 119 were men as we can see in the next table.

Patients were divided in three age category and with clinical and biochemical characteristics.

SEX	Total
Women	16
Men	119
Total	135

Table 1
GENDER DISTRIBUTION
OF THE PATIENTS

URBAN/RURAL	Total
RURAL	68
URBAN	67
Grand Total	135

Table 2
GEOGRAPHIC AREA OF THE
PATIENTS

Age group	Total
<50	28
50-70	61
>70	46
total	135

Table 3
AGE DISTRIBUTION OF THE
PATIENTS

Tension free meshplasty was accomplished in 131 patients diagnosed with uncomplicated inguinal hernia and herniorrhaphy was successfully performed at 4 patients with complicated inguinal hernia.

All patients were divided into three groups according to age: Group I (30-50 years), Group II (51-70 years), Group III (71-90 years). The oldest patients was 89 years old.

Among 135 patients, 131 patients were uncomplicated (127 unilateral and 8 bilateral) and four patients presented complicated inguinal hernia. (Two patients with obstruction, two patients with strangulation).

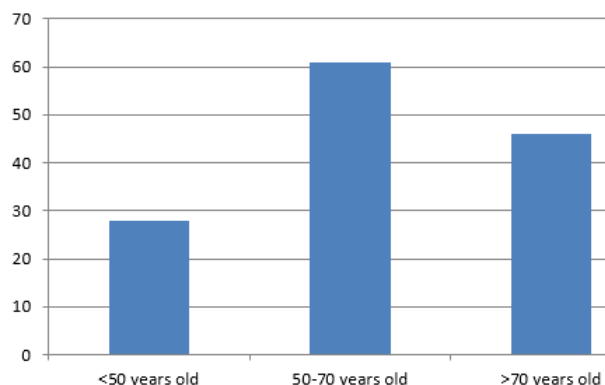


Fig.1. Distribution of the patients by age

Direct hernia was seen in 76 patients and indirect hernia in 59 patients. In 35 patients hernia was on the left side, in 92 patients hernia was on the right side and in 8 patients it was bilateral.

Type of hernia	Total
Bilateral hernia	8
Unilateral hernia	127
Total	135

Table 4
TYPE OF HERNIA:
UNILATERAL/
BILATERAL

TYPE OF PARIETAL DEFECT	Total
bilateral inguinal hernia	8
right inguinal hernia	92
left inguinal hernia	35
Total	135

Table 5
TYPE OF HERNIA:
BILATERAL/LEFT/
RIGHT

In our study we noticed that the incidence of inguinal hernia is higher for the group engaged in hardwork. Pain was met at 12 patients from our study and the majority of them presented associated comorbidities.

In table 6 we reveal different methods of anesthesia used by anesthesiologists to our patients.

From our study 107 patients had a remarkable recovery without any complication. Patients who underwent tension-free hernia surgery using prosthetic mesh, short-term complications were represented by 19 patients with urinary retention, 6 surgical local infection (superficial infections) and 2 scrotal edema. Patients with short-term complications were managed conservatively and they were discharged symptoms-free from the hospital. One patients from the herniorrhaphy group presented a wound dehiscence. For the long-term complication we had 6 patients presented recurrence. None of our patients presented chronic pain. In our study we had no perioperative death and no mortality rate.

The majority of the patients were discharged in the maximum 5 day after intervention. Average hospital stay was of 3.15 days. We scheduled follow-up controls at six weeks, three and six months post-intervention.

Type of inguinal hernia	Type of anesthesia	number of patients
Uncomplicated hernia(131 patients)	spinal anesthesia	115
	local anesthesia	9
	epidural anesthesia	5
	local anesthesia with sedation	2
	total	131
Complicated hernia(4 patients)	general anesthesia	4

COMPLICATION	BILATERAL	UNILATERAL	Total
dehiscence	0	1	1
scrotal edema	0	2	2
local infection	0	6	6
urine retention	2	17	19
without complication	6	101	107
Total	8	127	135

We monitorized patients in postoperative period and we had 6 patients with recurrence of hernia. They all were smokers, with co-illness like diabetes, pulmonary disease (chronic bronchitis and pulmonary asthma), cardiac disease (hypertension, atrial fibrillation, left ventricular hypertrophy and cardiomyopathy). They didn't present chronic pain, neither sinus or fistula formation.

In table 8 we are presenting the comorbidities found at the subjects included in our research. We can see that a very important percentage(29,63%) is represented by cardiovascular disorders.

Table 8
COMORBIDITIES OF THE PATIENTS

TYPE OF COMORBIDITY	Total
CARDIOVASCULAR	29.63%
SURGICAL	2.96%
ENDOCRINOLOGICAL	0.74%
INFECTIOUS	0.74%
METABOLIC	8.15%
NEUROLOGIC	4.44%
ONCOLOGIC	7.41%
PSYCHIATRIC	6.67%
UROLOGIC	5.93%
NO COMORBIDITY	33.33%
Total	100.00%

Every patients was evaluated clinical and biochemical before taking up the surgery. An electrocardiogram and a x-ray were performed routinely. The comorbidities were evaluated and all the patients were optimized before to repair the hernia. In the next tables and charts we are presenting the values and the levels of some biological and biochemical factors evaluated in our group.

Nowadays surgeons try to find the best elective repair of inguinal hernia, to be safety for the patients despite of age and with few complications and low mortality rate [14]. The incidence of patients diagnosed with

Table 6
CORRELATION BETWEEN THE TYPE OF HERNIA AND THE TYPE OF ANESTHESIA

Table 7
COMPLICATIONS AFTER SURGICAL INTERVENTION

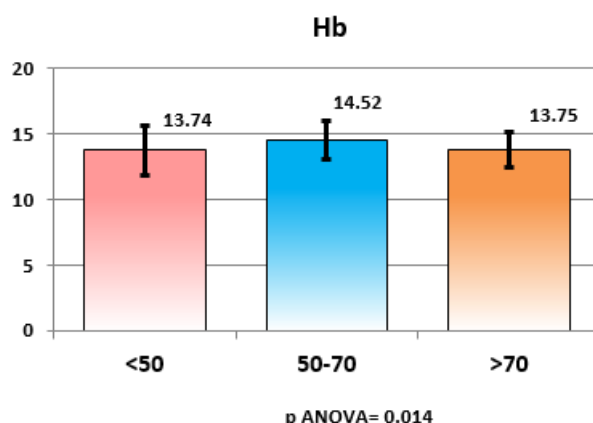


Fig. 2. Hemoglobine values by pAnova test

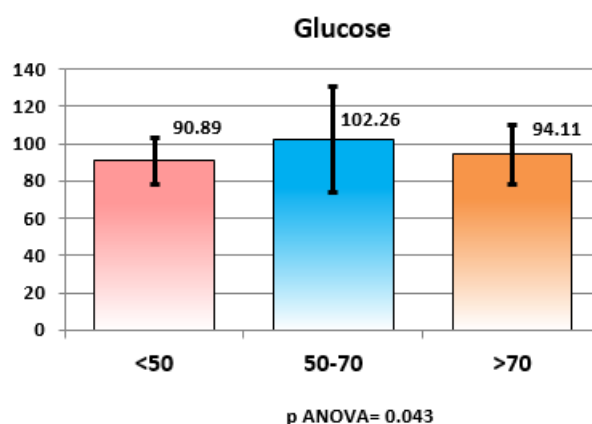


Fig. 3. Glucose level evaluated by pAnova test

uncomplicated or complicated inguinal hernia is higher in the elderly patients. They are also known to have concomitant illness which increase the risk of a surgery [15] but we didn't see this like a barrier to abdominal wall hernia repair.

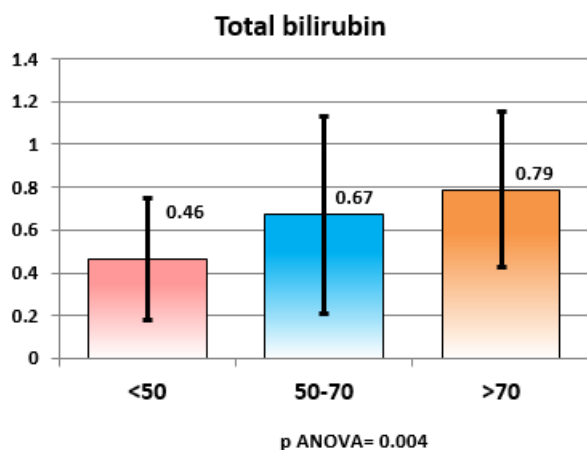


Fig. 4. Total bilirubin values by pAnova test

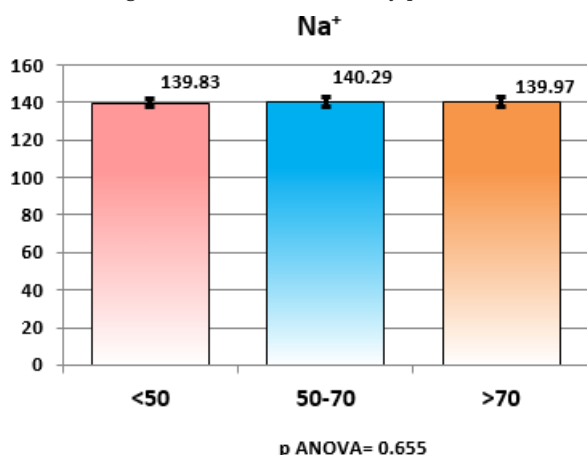


Fig. 5. The values of Na⁺ evaluated by pAnova test

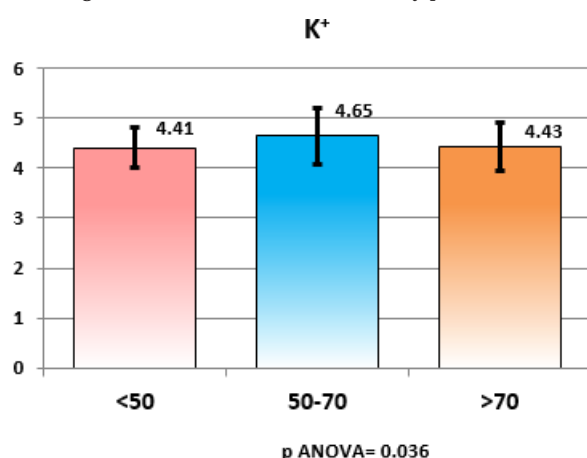


Fig. 6. The values of K⁺ evaluated by pAnova test

Risks assessment include general conditions and associated comorbidities of the patients. In our study we reveal in table 8 the type of comorbidities which we meet. We found a study on elderly patients diagnosed with different cardiovascular disease and go through a hernia repair using a tension-free surgery and they have the same results like elder patients with non-cardiac disease, there are no difference between short and long term complications and the same percentage for the hospitalization days [16, 17].

A great difference in inguinal hernia is between sex ratio 9:1 from the men to women [17, 18]. Dabbas et al [19, 20] reported that inguinal hernia is 15 times more frequently at men than women. In our study the result were similar, we had 119 number of male and 16 number of female patients.

The same authors, Dabbaset et al [21] revealed that inguinal hernias are more frequently met on the right sides,

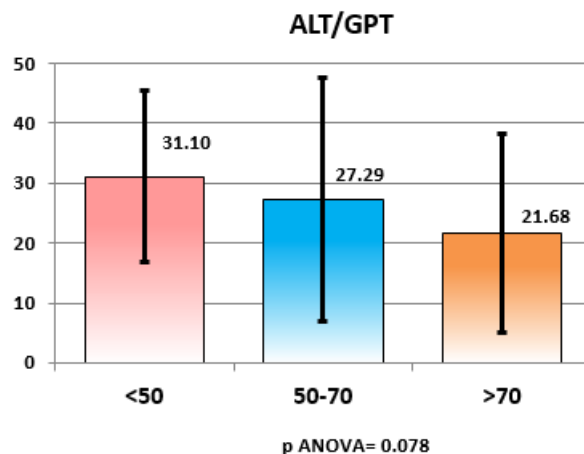


Fig. 7. The values of ALT/GPT evaluated by pAnova test

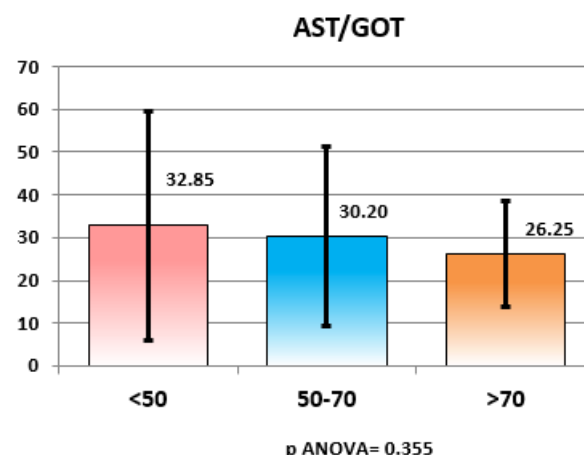


Fig. 8. The values of AST/GOT evaluated by pAnova test

the same preponderance we have seen to our patient. We have 92 patients with right sided hernia, 35 patients with left side hernia and 8 bilateral.

Literature showed that the incidence of inguinal hernia is more often seen at patients engaged in hard and strenuous work [21], this appears to occur the same with the patients from our study.

Shaikh et al. [21] demonstrate that 90.7 % of the patients had a recovery without any complication and 5% of patients appear to have a surgical local infection. In our study 9 patients presented local infection, 19 patients urinary retention and 2 scrotal edema.

In our study the type of intervention we choose *Tension-free meshplasty* and *Herniorrhaphy* with the prosthetic synthetic materials proved to be convenient with few short and long term complication, safe and simple without mortality risk for our patients.

We considered that the blood glucose level represents an important parameter for the evolution of the disease and also for the prognosis. It is well known that in obesity, visceral adipose tissue increase the metabolic risk and the secretion of proinflammatory cytokines [22].

Conclusions

In today's modern surgery, the implantation of prosthetic materials was widely accepted along with the increase number of indications for their use.

Inguinal hernia repair is related to important morbidity for elderly cohort, but the rates of mortality is low. Consequently, consideration should be given in optimizing the cardiopulmonary status and the other comorbidities of the patient before to repair abdominal wall hernia in order to avoid both short and long term complication.

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