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ANALYSIS OF IMMEDIATE AND LONG-TERM RESULTS OF SUBLAY AND TAPP TECHNIQUES IN THE TREATMENT OF VENTRAL HERNIAS

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SUMMARY. The accumulated clinical experience has proven that the "sublay" technique allows to achieve greater functional activity of the anterior abdominal wall and is the method of choice in the treatment of ventral hernia. The use of self-adhesive nets during laparoscopic transabdominal preperitoneal plasty (TAPP- Transabdominal Preperitoneal Plastic) in the treatment of small and medium ventral hernia is safe and effective, with low values of postoperative pain syndrome and rapid functional recovery after surgery, without increasing the recurrence in the short term.

The aim – was to analyze the immediate and long-term results of "sublay" and TAPP techniques in the treatment of ventral hernias of lower and median localization. The author noted that the search for technical methods aimed to reduce the intra-abdominal pressure in this hernioplasty technique was relevant and practically significant.

Material and Methods. The work was performed on the basis of the surgical department of the State Institution "Specialized Multi-Purpose Hospital №1 of Ministry of Health of Ukraine", Department of General Surgery of the State Institution "Dnipro State Medical University of Ministry of Health of Ukraine".

Results. Comparison of immediate and long-term results of peritoneal-prosthetic-aponeurosis thickness studies showed a statistically significant difference ($p < 0.001$) using different techniques. When analyzing the separated results, reliable differences ($p < 0.001$) depending on the gender of patients were recorded. Thus, in males, when using the "sublay" technique the peritoneal-prosthetic-aponeurosis thickness was greater by 1.15 mm (by 42.43 %) in comparison with the Tapptechnique, and in females, by 1.16 mm (by 42.09 %), respectively.

Conclusions. The analysis of the immediate and long-term results of the "sublay" and TAPP techniques in the treatment of ventral hernias of lower and median localization showed that the "sublay" technique was characterized by traumatic surgical intervention, shift of the prosthesis to one side, as a consequence of its deformation. When using this technique, peritoneum-prosthetic-aponeurosis thickness values were significantly higher – by 13.16 % and 42.40 % in the early and distant postoperative periods, respectively. Also, when using the Tapp technique in the distant period the thickness was significantly reduced ($p < 0,0001$) by 49,47 % in comparison with the immediate results.

KEY WORDS: treatment of ventral hernias of lower and median localization; "sublay" technique; Tapp technique; laparoscopic study.

Introduction. The accumulated clinical experience has proved that the "sublay" technique allows achieving greater functional activity of the anterior abdominal wall and is the method of choice in the treatment of ventral hernia [10]. As an example of large postoperative ventral hernia of median localization, the technique reduces the duration of surgery and anesthesia, is technically simple, less traumatic, and allows for more reliable fixation of the endoprosthesis mesh, which improves the immediate and long-term results of surgical treatment of patients [6].

The studies show that the use of prosthetic hernioplasty by "sublay" method in 10 – 55 % is accompanied by the occurrence of chronic pain syndrome in the postoperative period, the development of which can be caused by traumatization of intercostal nerves during placement and fixation of the mesh prosthesis [5, 6]. To reduce the possible risk of traumatization of the intercostal nerves when using this technique, it is necessary to consider the features of their topography in the lateral margin of the rectus abdominis soft muscle, which, however, have not been sufficiently studied and reported in the literature (Skipidarnikov et al., 2013). The suturing of a hernia gate that is more than 5.0 cm wide leads to increased intra-abdominal pressure and a high risk of postoperative complications [7, 3].

However, the retromuscular mesh position is characterized by a lower risk of purulent complications and recurrence compared to all other implant positions [8, 4]. It is worth noting that, on average, hernia defects, for which retromuscular plasty is used, are more than twice as large by area than in other mesh implant positions. In this method, separation plastics are most frequently used (73 %) [8]. The use of the "sublay" technique is acceptable for small and medium hernias and certain conditions are met, but its advantage for large hernias can sometimes cause complex problems [4].

The use of self-adhesive nets during laparoscopic transabdominal preperitoneal plasty (TAPP) in the treatment of small and medium ventral hernia is safe and effective, with low postoperative pain syndrome and rapid functional recovery after surgery, without increasing recurrence in the short term. However, the main disadvantages of this technique are directly related to the technique of surgical intervention: technical complexity of mesh horniness in a small space and difficulties in maintaining peri-

toneum intact during dissection of the anterior cervical space [1].

The cons of the method are technical difficulties and sometimes impossibility to perform surgical intervention for large and giant ventral hernias. In addition, one of the specific risks of TAPP is possible intestinal damage in patients with a large number of intestinal adhesions to the inguinal area or to the hernia sac [2].

Thus, it is relevant and practically significant to search for technical techniques aimed at reducing intra-abdominal pressure in this hernioplasty technique. For example, a wave-shaped loosening incision of the anterior wall of the aponeurotic vagina of the rectus abdominis muscle significantly more effectively (by 53 %) reduces the tension of sutures during suturing of diastasis of the rectus abdominis muscle [2, 9].

The aim of this work was to analyze the immediate and long-term results of sublay and TAPP techniques in the treatment of lower and medial ventral hernias.

Material and Methods. The work was performed on the basis of the surgical department of the State Institution "Specialized Multiprofile Hospital № 1 of the Ministry of Health of Ukraine", Department of General Surgery of the State Institution "Dnipro State Medical University of the Ministry of Health of Ukraine". During the period from 2013 to 2019, 405 patients were operated on, which were divided into 2 groups according to the method of surgical intervention. 254 patients operated with the Tapp method (110 men, 144 women); 151 patients operated with the "sublay" method (72 men, 79 women).

Instrumental studies included investigation of the operative zone using ultrasound investigation in 2D mode on ultrasound machines MyLabClass C Esaote and Simens Acuson Juniper, we used 7.5 MHz / 42 mm linear transducers, 3.5 MHz convex transducers CA541 60 ° 60 mm. Blood flow velocity in the arteries in the area of surgical intervention was determined by Doppler study of vessels, 3.5 ± 0.4 mm in diameter, which were located in the basins of aa. Epagastrica inferior, Superior epigastric artery, Deep circumflex artery. Statistical data processing was performed using MS Excel tools.

Results. Comparison of immediate and long-term results of peritoneal prosthetic-aponeurosis thickness revealed a statistically significant difference ($p<0.001$) when using different techniques (Table 1). On the 3rd-5th day the thickness was greater by 0,5 mm (by 13,16 %) in the whole group of patients in comparison with the Tapp method. There were no significant differences depending on the sex of the patients – both men and women had 0.5 mm more peritoneal-prosthetic-aponeurosis thickness compared to the Tapp technique.

Table 1. Analysis of immediate and long-term results of peritoneal-prosthetic-aponeurosis thickness studies

Parameter	Peritoneal-prosthetic-aponeurosis thickness, mm on day 3 to 5 after surgical interventions	Peritoneal prosthetic-aponeurosis thickness, mm after 6–48 months after surgical interventions
"Sublay" method		
Men	3.7±0.2*	2.72±0.43*
Women	3.9± 0.2**	2.76±0.2**
All in all	3.8± 0.2***	3.8±0.2***
TAPP method		
Men	3.2± 0.2*	1.57±0.29*
Women	3.4± 0.4**	1.60±0.26**
All in all	3.3± 0.4***	3.3±0.4***

Data are given as mean ± standard deviation; * Statistically significant difference between the methods $p<0.001$; ** Statistically significant difference between the methods $p<0.001$; *** Statistically significant difference between the methods $p<0.001$.

At 6–48 months after surgical interventions, the thickness was statistically significantly ($p<0.001$) greater by 1.17 mm (42.40 %) in the whole group of patients using the "sublay" technique compared to the Tapp method.

When analyzing the separated results, reliable differences ($p<0.001$) were recorded depending on the gender of patients. Thus, in men, the thickness of peritoneal prosthesis-aponeurosis was 1.15 mm greater (by 42.43 %) compared to the Tapp method. And in women, it was 1.16 mm (42.09 %) greater, respectively.

As compared to the early postoperative period, the value of peritoneum-peritoneum thickness was reliably ($p<0.0001$) reduced by 27.48 % in the group of patients operated on according to "sublay" method, and reliably ($p<0.0001$) by 49.47 % in the group of patients operated on according to Tarra method.

Study of blood flow velocity in the operative intervention zone in patients operated on using Tapp technique was low and equaled 45.83±4.12 cm/sec that was significantly higher ($p<0.001$) by 9.06 % in

comparison with patients operated on using "sublay" technique (table 2). In the latter case the values were 42.02 ± 4.83 cm/s and were also determined as reduced.

Table 2. Analysis of immediate and long-term results of studies of blood flow velocity in the arteries in the surgical intervention zone

Parameter	Blood flow velocity (cm/s) on day 3 to 5 after surgical interventions	Blood flow velocity (cm/s) after 6–48 months after surgical interventions
"Sublay" method		
Men	41.07±5.37*	41.07±5.37*
Women	42.29± 4.55**	46.04±4.98
All in all	42.02± 4.83***	45.15±4.93**
TAPP method		
Men	45.83±3.92*	45.83±4.18*
Women	45.83±4.18**	47.67±3.24
All in all	45.83±4.12***	47.50±3.25**

RMS – standard deviation; *, **, *** – statistically significant difference between the methods p<0.001.

The immediate results among men were significantly (p<0.01) greater (10.39 %) among the patients operated on by the Tapp technique compared with the "sublay" technique. The difference of blood flow velocity values in female patients operated on by the Tapp technique was significantly (p<0.05) greater by 7.23 % compared with the "sublay" technique.

Analysis of long-term results of vascular Doppler study of patients showed that in the group of patients operated on by Tapp technique the parameters of blood flow rate recovered and were within the range of 42 – 54 cm/s, and in the group of patients operated on by "sublay" - within the range of 38–54 cm/s. Thus, on average, blood flow velocity was 4.76 cm/s (by 3.54 %) lower using "sublay" technique in comparison with Tapp method.

Higher blood flow velocity with Tapp method can be explained by less traumatic nature of this technique and undisturbed space between the muscle and aponeurosis.

Blood flow speed was significantly lower (p<0.01) only in men – by 4.76 cm/s (by 8.99 %) when using "sublay" technique in comparison with Tarre method.

As compared with the early postoperative period the blood flow velocity in the vessels significantly increased (p<0.01) only in the group of patients operated on using "sublay" technique – by 7.43 %. There were no significant changes in the group of patients operated on according to the Tapp method.

Conclusions. The analysis of the immediate and long-term results of the "sublay" and TAPP techniques in the treatment of ventral hernias of lower and median localization showed that the "sublay" technique was characterized by traumatic surgical intervention, shift of the prosthesis to one side, as a consequence of its deformation. When using this technique, peritoneum-prosthetic-aponeurosis thickness values were significantly higher – by 13.16 % and 42.40 % in the early and distant postoperative periods, respectively. Also, when using the Tapp technique in the remote period, the thickness was significantly reduced (p<0.0001) by 49.47 % compared with the immediate results.

At the same time, less traumatic surgery, and integrity of the space between the muscle and aponeurosis is the advantage of the Tapp method, which is proved by the reliably higher blood flow rate – by 3.54 % in the early postoperative period.

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АНАЛІЗ БЕЗПОСЕРЕДНІХ ТА ВІДДАЛЕНИХ РЕЗУЛЬТАТІВ МЕТОДИК «SUBLAY» ТА TAPP ПРИ ЛІКУВАННІ ВЕНТРАЛЬНИХ ГРИЖ

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РЕЗЮМЕ. Накопиченим клінічним досвідом доведено, що техніка «sublay» дозволяє досягти більшої функціональної активності передньої черевної стінки і є методом вибору в лікуванні вентральних гриж. Використання самоклеючих сіток під час лапароскопічного дослідження трансабдомінальної преперитонеальної пластики (TAPP – Transabdominal Preperitoneal Plastic) у випадку лікування малих і середніх вентральних гриж є безпечним і ефективним, з низькими значеннями післяопераційного больового синдрому і швидким функціональним відновленням після операції, без збільшення випадків рецидивів у короткостроковій перспективі.

Метою даної роботи був аналіз безпосередніх та віддалених результатів методик «sublay» та TAPP при лікуванні вентральних гриж нижньої та серединної локалізації. Автором наголошено, що актуальним і практично значущим є пошук технічних прийомів, спрямованих на зменшення внутрішньочеревного тиску при даній методиці герніопластики.

Матеріал і методи. Робота проведена на базі хірургічного відділення Державного закладу «Спеціалізована багатопрофільна лікарня № 1 Міністерства охорони здоров'я України», кафедрі загальної хірургії Державного закладу «Дніпровський державний медичний університет Міністерства охорони здоров'я України».

Результати. Порівняння безпосередніх та віддалених результатів досліджень товщини очеревини-протез-апоневрозу показало статистично достовірну різницю (при p<0,001) при використанні різних методик. При аналізі відділених результатів були зафіксовані достовірні відмінності (при p<0,001) залежно від статі пацієнтів. Так, у чоловіків, при використанні методики «sublay» товщина очеревини-протез-апоневрозу була більшою на 1,15 мм (на 42,43 %), порівняно з методикою TAPP, а у жінок – на 1,16 мм (на 42,09 %) відповідно.

Висновки. Проведений аналіз безпосередніх та віддалених результатів методик «sublay» та TAPP при лікуванні вентральних гриж нижньої та серединної локалізації показав, що методика «sublay» відрізнялася травматичністю оперативного втручання, зміщенням протеза в один із боків, як наслідок його деформації. При використанні даної методики достовірно більшими були значення товщини очеревини-протез-апоневрозу – на 13,16 % та 42,40 % у ранній та віддалений післяопераційні періоди відповідно. Також при використанні методики TAPP у віддалений період товщина достовірно зменшувалася (при p<0,0001) на 49,47 %, порівняно з безпосередніми результатами.

КЛЮЧОВІ СЛОВА: лікування вентральних гриж нижньої та серединної локалізації; техніка «sublay»; методика TAPP; лапароскопічне дослідження.

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