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Surgical Treatment Of Incisional Ventral Hernias In Elderly And Senile Patients (Literature Review)

Yahyoev Sardorbek Mamasobir ogli
PhD, Department of Surgical Diseases, Andijan State Medical Institute, Uzbekistan

Farkhodjonova Dilafzabonu Dilshodjon qizi
Department of Surgical Diseases, Andijan State Medical Institute, Uzbekistan

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Abstract: Aim of the study is to conduct an analysis of the diagnosis and treatment methods of postoperative ventral hernias in elderly and senile patients based on local and international articles.

This review of surgical treatment of incisional ventral hernias used articles from Scopus, PubMed and Google Scholar databases and conducted a general analysis. Thus, a review of national and international literature shows that a substantial number of studies focus on the surgical management of large and giant postoperative ventral hernias. However, limited research specifically addresses surgical treatment in elderly and senile patients. Insufficient emphasis is placed on the multifactorial etiology and the multidisciplinary characteristics of this patient population. Failure to account for polymorbidity in older patients with large and giant postoperative ventral hernias inevitably leads to a high incidence of postoperative complications.

Keywords: Incisional ventral hernias, hernioplasty, elderly and senile patients.

Introduction: A wide variety of hernioplasty methods is due to the lack of a unified position on this problem. The introduction of modern plastic materials into surgery has improved the quality of herniological care [6-11]. The situation is more complicated in cases of postoperative ventral hernias in the elderly and senile age [1-4]. It should be noted that 80-85% of such patients have severe concomitant diseases, and therefore the mortality rate continues to be quite high, amounting to 7-10%, and in complicated forms - 25%, which cannot satisfy practicing surgeons. The recurrence rate for giant hernias reaches 64%. In 20-47% of patients after prosthetic hernioplasty, local postoperative complications occur [2-6].

The incidence of postoperative ventral hernias ranges from 20 to 22% among repeat-operated patients [2]. Among patients requiring emergency surgery, most frequently those operated on for acute intestinal obstruction, the percentage of patients with postoperative ventral hernias reaches 10 to 33% [8]. Surgeons face particular challenges with strangulated ventral hernias. This category of patients has a high postoperative mortality rate of up to 12% [10-15]. These patients are most often over 60 years of age and have a long history of hernias. According to our data, the majority of these patients are female, accounting for 87.2% [3-11]. However, in different clinics, gender ratios vary; we attribute the occurrence of ventral hernias in this category of patients to weakness of the anterior abdominal wall, especially in the postpartum period, and the frequency of cesarean sections [12-16].

Complications in the early postoperative period, and consequently, unsatisfactory outcomes with the formation of ventral hernias, occur with abdominal compartment syndrome. Important factors during the surgery include the interaction between the surgeon and anesthesiologist; adequate support; a constant tidal volume throughout the entire surgery [20-26].

Important factors include impaired intestinal motility, intoxication leading to pulmonary-cardiac complications, impaired renal function, changes in blood rheology with the development of thromboembolic disorders in up to 10% of cases in peripheral vessels. Pulmonary embolism and

mesenteric embolism are quite common [14, 15]. These serious complications lead to death in a significant percentage of cases. Complications pose the greatest risk in elderly and geriatric patients, as well as in patients with chronic cardiopulmonary pathology, obese patients, and those who have undergone repeated laparotomy surgeries, especially with a non-standard incision on the anterior abdominal wall, accompanied by metabolic disturbances in the connective tissue, which affects postoperative scar formation [1- 4]. There are many modifications of surgical treatment, but the most common techniques involve an endoprosthesis, either fixed over the fascial defect or placed behind the muscles. Other techniques are more complex and are more often used in specialized hernia centers. Techniques using local tissue should not be ruled out, especially for "small volume" hernias [16-25]. Relatively new methods for treating ventral hernias—laparoscopic surgery—have become more commonly used. The size of the hernial orifice, the hernial sac, and its contents are of great importance [4-7]. A tailored surgical approach, support, and postoperative wound closure technique should be selected for each individual patient [18-21].

Hernia repair with local tissues. A frequently used group is the aponeurotic group. The main techniques include: immersion of the aponeurosis sutures, aponeurosis duplication, and plastic surgery with opening of the rectus abdominis muscle sheaths and formation of a "counterfold" [23-28].

Methods using immersion sutures on the aponeurosis have proven themselves to be reliable and easy to perform. Consequently, they can be recommended for the surgical treatment of elderly and senile individuals with extensive and giant postoperative ventral hernias. The essence consists of eliminating the abdominal wall defect with several rows of interrupted sutures. First, the aponeurosis defect is sutured. The second row of sutures immerses the previous one. The third row of sutures is placed on the anterior wall of the rectus abdominis sheath, also immersing the previous sutures.

Musculoaponeurotic plastic surgery technique is characterized by the use of not only aponeurotic structures, but also muscles. Approximation of the rectus abdominis muscle sheaths formed the basis of a large number of hernioplasty techniques.

K.M. Sapezhko proposed creating a longitudinal duplication from peritoneal-muscular-aponeurotic flaps. This technique is widely used today, including in elderly and senile patients with extensive and giant postoperative ventral hernias [12-14].

Biondi and Pfannenstile proposed an original technique of musculoaponeurotic hernia repair. Following a standard hernia repair procedure, the rectus abdominis muscle sheaths are incised transversely. The posterior leaflet of the rectus abdominis muscle sheath is sutured transversely, the rectus muscles are sutured longitudinally, and the anterior leaflet of the rectus abdominis muscle sheath is also sutured transversely. The Pfannenstile approach remains widely used today as an approach with minimal risk of developing a ventral hernia, although the technique itself has not achieved widespread acceptance or popularity, particularly in elderly and senile patients with extensive and giant postoperative ventral hernias [31-35].

Hernioplasty using a hernial sac requires special attention. The tissue of the hernial sac is not designed to withstand intra-abdominal pressure. Nevertheless, many authors supplement the above-mentioned repair methods by "reinforcing" the suture line with duplications from the hernial sac. It should be noted that these techniques have not gained widespread popularity, but some clinics continue to use them to this day [35-38].

Unfortunately, in elderly and senile patients with extensive and giant postoperative ventral hernias, the above-described autoplasty methods are ineffective. Experiments have demonstrated degenerative changes in abdominal wall tissue in the presence of postoperative hernia [28-30]. Consequently, the replaced scar tissue is less durable. Furthermore, progressive changes in the shape and position of the anterior abdominal wall muscles in hernia patients lead to loss of the medial attachment point, resulting in functional impairment and the development of myogenic contracture [22-24].

Additional plastic materials used in herniology have proven their effectiveness, especially in elderly and geriatric patients with extensive and giant postoperative ventral hernias.

The majority of these procedures were developed at the turn of the XIX and XX centuries. Subsequent modernizations and refinements primarily affected the materials used for repair [18-21].

Hernioplasty using preserved dura mater. Among homoplastic techniques, only the use of dura mater remains relevant, and many surgeons, prefer this technique for elderly and senile patients with extensive and giant postoperative ventral hernias [1-5].

It should be noted that dura mater is highly durable and elastic, is less susceptible to infection, and has low immunological reactivity. Due to these qualities, it can be used to close fistulas (intestinal, pancreatic, etc.), strangulated hernias, and in surgeries involving opening the gastrointestinal tract (stomach resection,

bowel resection, etc.) [5-9].

Currently, in addition to the usual technical difficulties associated with the procurement and storage of implants, the problem of HIV infection and viral hepatitis has been added, which hinders the widespread use of the technique [12-16].

Autodermoplasty. Of the autoplastic techniques, only autodermoplasty remains relevant due to its low trauma and ease of implementation (compared to the use of autofascia) [25-29].

When performing autodermoplasty, it is important to secure the skin flap with moderate tension, as well as to mobilize the patient early. Under these conditions, the prosthesis heals better, and thanks to the force exerted, the skin flap more quickly degenerates into tendon-connective tissue, which is particularly important in elderly and senile patients with extensive and giant postoperative ventral hernias. This skin flap transformation was actively used by proponents of autodermoplasty to widely promote this method [5-9].

However, despite the fact that the recurrence rate of POVH with this technique decreased to 11.6% - 4.6%, the method's shortcomings still prevented its widespread use [4-8].

Another problem was that the skin flap degenerates not into vaponeurotic tissue, but into scar (loose connective) tissue, which has significantly lower resistance to physical stress [9-14].

The use of autodermoplasty in cases of large hernias combined with intestinal and/or ligature fistulas is generally inappropriate [5-8].

Prosthetic hernioplasty. Since the 1980s, with the introduction of high-molecular polymers, a completely new stage in herniology has emerged [4-8]. To effectively solve problems of prosthetic hernioplasty, it is necessary to take into account the main characteristics of synthetic materials. The use of nylon ligatures, foam rubber, polyvinyl alcohol, fluoroplastic and similar materials has shown poor results. Their use has increased the frequency of infiltrates, seromas and suppurations, long-term non-healing fistulas, and graft sequestration [10-12]. Some surgeons have reported the carcinogenicity of plastics during their long-term implantation. The synthetic material must be chemically inert, durable, elastic, easy to sterilize, and affordable. The prosthesis must not have carcinogenic or anti-inflammatory properties. Recently, an additional requirement has emerged: the ability to form a barrier to the development of adhesions from the abdominal cavity [16-22]

There are two broad groups of prosthetic hernioplasty techniques: "tension-free" (true tension-free and combined) and "tension-based" methods. Tension-free hernioplasty utilizes the patient's own tissues to close the hernia defect, without fully adapting the hernia defect's edges, in combination with a prosthesis. The mesh can be placed using onlay, inlay, onlay+inlay, or sublay techniques [4-7]. With tension-based hernioplasty, the hernia defect is completely repaired using local tissues by aligning and adapting its edges layer by layer, thereby restoring the normal topographic and anatomical structure of the abdominal wall. In this case, the prosthesis serves as additional reinforcement and can be placed using an onlay or sublay technique. Based on the above, most leading hernia surgeons call tension-based repair radical, while tension-free repair is considered palliative. Tension-free repair does not achieve complete adaptation of the hernia defect edges using the patient's own tissue. The mesh implant is fixed using onlay, inlay, onlay+inlay, or sublay techniques [5-8].

Reconstruction of the anterior abdominal wall restores the function of the abdominocaval pump, which directly contributes to the prevention of thromboembolic complications, especially in elderly and senile patients with extensive and giant postoperative ventral hernias [10]. This justifies the use of tension-based methods for prosthetic hernioplasty of ventral hernias, as their advantage over tension-free methods lies in eliminating the preoperative pathological arrangement of the anatomical structures of the anterior abdominal wall [24]. In extensive and giant postoperative ventral hernias, reduction of the hernial contents into the abdominal cavity with tight suturing of the abdominal wall defect can lead to increased intra-abdominal pressure. Intestinal motility is impaired, diaphragmatic excursion is limited, cardiac activity and respiration are impaired, and this is more pronounced in elderly and senile patients with extensive and giant postoperative ventral hernias [14-16]. Such negative aspects can be avoided by defining clear indications for a particular type of surgery, preoperative patient preparation, and timely prevention of cardiopulmonary complications in the early postoperative period, especially in elderly and senile patients with extensive and giant postoperative ventral hernias. At the same time, the use of tension repair results in up to 20% recurrence of the disease [25]. Most domestic and foreign authors note from 15 to 35% recurrence in prosthetic hernioplasty of extensive and giant incisional ventral hernias.

Endovideosurgical prosthetic techniques. Surgeons' attempts to improve the results of the Rives procedure, and the advent of videolaparoscopy, have led to the development of minimally invasive techniques in hernia surgery [34-38].

Laparoscopic hernia repair techniques using synthetic materials exist, which, due to the absence of a large skin incision, have reduced the incidence of wound complications. However, for a number of reasons, they have not gained widespread popularity among surgeons, as discussed below.

Complications after laparoscopic hernioplasty occur in 2–26% of cases, and the recurrence rate varies from 0 to 17% [31-33].

According to some authors, open hernioplasty using modern synthetic materials is less complex and more reliable [6]. Other disadvantages of laparoscopic hernioplasty include the need for expensive equipment, the need for specialized surgeon qualifications, and the need to perform the surgery under conditions of tension pneumoperitoneum, which limits its use in elderly and senile patients with extensive and giant postoperative ventral hernias with a significant number of concomitant somatic pathologies. Therefore, laparoscopic hernioplasty for IVH is an experimental technique, and its place in the treatment of this type of hernia has not yet been determined [14-17].

Studying various procedures for IVH to clarify their place in the modern hernia surgeon's repertoire and elucidating the effectiveness of repair methods for various types of hernias should contribute to improving both immediate and long-term treatment outcomes for this complex group of patients. The development and implementation of systems for predicting the effectiveness of various hernia repair methods tailored to each individual patient should aid in the training of young surgeons and contribute to raising the overall level of hernia care in today's world.

Features of systemic complications of surgical treatment of postoperative hernia in the elderly and senile patients. To determine the degree of surgical risk and predict acute cardiopulmonary failure in the early postoperative period in elderly and senile patients with IVH, most authors use pulmonary function testing (PFT) [28]. Spirometry certainly provides essential information about possible respiratory disorders in patients. However, using this method during the first postoperative day is not feasible, which complicates the dynamic monitoring of respiratory disorders [34-36].

Doppler echocardiography is widely used in therapeutic practice. It allows not only to detect pulmonary hypertension but also to assess its severity in patients with heart defects, dilated cardiomyopathy, chronic myocarditis, chronic obstructive pulmonary disease, and essential pulmonary hypertension [25-27].

The most significant doppler echocardiographic parameters for quantitatively assessing the degree of pulmonary hypertension are pulmonary artery systolic pressure, pulmonary vascular resistance, and mean calculated pulmonary artery pressure. ECHO-CG allows us to determine changes in intracardiac hemodynamics in pulmonary hypertension, assess its severity, and conduct dynamic monitoring during treatment. These data appear to be highly valuable for elderly and senile patients with extensive and giant pulmonary arterial hypertension, the overwhelming majority of whom exhibit PFT abnormalities, especially in the postoperative period. However, the use of ECHO-CG in surgical practice, according to the literature, is limited to a few observations [23].

High intra-abdominal pressure syndrome, or abdominal compartment syndrome, is an increase in intra-abdominal pressure that most often develops after trauma and/or surgery on the abdominal organs and leads to multiple organ failure [18-19]. Increased intra-abdominal pressure does not always lead to the development of abdominal compartment syndrome. Despite the fact that high intra-abdominal pressure syndrome has received increasing attention in recent decades, there is no precise data on its frequency [11].

Multiple organ failure develops with a sudden increase in intra-abdominal pressure to 30 mmHg or to 15 mmHg, provided that it persists for more than 24 hours. This classification is convenient for determining the indications for a particular type of treatment depending on the stage of the pathological process described above [6-9].

Thrombosis and embolism are serious complications. Precipitating factors include surgical trauma, anesthesia, postoperative inactivity, and cardiovascular disease. In elderly and senile patients with extensive and giant pulmonary embolism, pulmonary embolism (PE) is a preexisting disorder of venous hemodynamics (blood flow in the common femoral veins is slowed due to a malfunction of the suction and breathing mechanism of the abdominocaval pump). Pulmonary embolism (PE) accounts for over 50% of deaths after hernia repair and, in the vast majority of cases, develops within the first week of the postoperative period [3-7].

Overall, an analysis of domestic and international literature revealed that numerous studies have been devoted to surgical care for patients with extensive and giant postoperative ventral hernias. However, few studies devote sufficient attention to surgical care for the elderly and senile. Little attention is paid to the multi-etiology and multidisciplinary nature of this patient group. Without considering polymorbidity, surgical treatment strategies for older patients with

extensive and giant postoperative ventral hernias are destined to have a high complication rate. Therefore, the issue of surgical care for elderly patients with extensive and giant postoperative ventral hernias has been insufficiently studied in terms of organizational and tactical approaches to outpatient and inpatient treatment, taking into account modern technologies.

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