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Research Progress on Treatment Options for Inguinal Hernia in Elderly Patients

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Abstract

With the acceleration of global population aging, the incidence of inguinal hernia in elderly patients is on the rise, making treatment selection an important research topic in the medical field. Traditional tension hernia repair has gradually been replaced by tension-free hernia repair due to postoperative pain and high recurrence rates. The latter significantly reduces recurrence risk through mesh technology. Laparoscopic hernia repair further reduces surgical trauma and accelerates patient recovery. Different mesh types have their own characteristics and application differences. The application of different treatment methods in elderly patients is influenced by various factors, including patients' underlying diseases, economic status, doctors' experience, and hospital conditions. In the future, personalized treatment strategies and precise diagnosis and treatment models are expected to provide better and more efficient treatment options for elderly patients. The author now provides a review of research on treatment selection for inguinal hernia in elderly patients, aiming to provide a clinical reference.

Keywords

Elderly Patients, Inguinal Hernia, Treatment Options, Surgical Methods, Mesh, Non-Surgical Treatment

1. Introduction

Inguinal hernia refers to a mass in which abdominal viscera or tissues protrude toward the body surface through congenital or acquired abdominal wall weakness or defect areas. It is one of the common diseases in general surgery. According to statistics, more than 20 million patients worldwide undergo inguinal hernia repair surgery every year [1], among which the incidence rate of inguinal hernia in the elderly is as high as 11.3% [2]. With the continuous development of surgical tech-

niques, the treatment methods for inguinal hernia have become increasingly diversified. However, due to the multiple comorbidities of elderly patients, the diseases are more complex, and life-threatening complications such as hernia incarceration are more likely to occur. Therefore, for the treatment of inguinal hernia in elderly patients, how to choose the optimal treatment method has become a major challenge in clinical practice. This article aims to conduct a systematic review of existing literatures, comprehensively discuss the treatment options for inguinal hernia in elderly patients, and provide a scientific and practical reference basis for clinicians, so as to improve the treatment level of inguinal hernia in elderly patients.

2. The Characteristics of Inguinal Hernia in the Elderly

In China, the age criterion for defining elderly patients with inguinal hernia is 60 years old [2]. As the incidence of inguinal hernia increases with age, elderly inguinal hernia has its unique clinical characteristics. First, due to the degeneration of abdominal wall muscles and connective tissues with age, the hernial ring is often large and the tissues are fragile, which increases the difficulty of surgical repair. Second, elderly patients often have multiple underlying diseases such as hypertension, chronic obstructive pulmonary disease (COPD), and diabetes, significantly increasing the risks of surgery and anesthesia [3]. In addition, elderly patients have decreased immunity, poor tolerance to pain, and slow recovery of gastrointestinal function and motor ability after surgery, thus increasing the occurrence of postoperative complications. From a pathophysiological perspective, the occurrence of inguinal hernia is mainly related to the decrease in abdominal wall strength and the increase in intra-abdominal pressure. Age-related changes in the elderly, such as abnormal collagen metabolism and muscle atrophy, lead to a decrease in abdominal wall strength, while common problems in the elderly, such as long-term chronic cough, constipation, and benign prostatic hyperplasia, cause long-term increases in intra-abdominal pressure. This dual mechanism not only results in a high incidence of primary hernia in elderly patients but also relatively increases the risk of postoperative recurrence.

3. Surgical Treatment Methods

Once an inguinal hernia is formed in adults, surgical treatment becomes the only curative method [1] [4]. The surgical approaches include traditional tension hernia repair, tension-free hernia repair, and laparoscopic hernia repair. The first two are also known as open surgeries.

3.1. Traditional Tension Hernia Repair

Traditional tension hernia repair is a classic method for treating inguinal hernia. It mainly achieves hernia repair by suturing defects to repair and strengthen the weak area of the abdominal wall. The principle is to directly pull together and suture the tissues, such as muscles and fascia, on both sides of the defect to enhance the resistance of the abdominal wall and close the hernial ring [5]. It is suit-

able for patients of a young age, with small defects, and strong regenerative capacity of surrounding tissues. It mainly includes classic surgical procedures such as the Ferguson method for strengthening or repairing the anterior wall, and the Halsted method, Bassini method, McVay method, Shouldice method, etc., for strengthening the posterior wall [6] [7]. Although this surgical method was widely used in the early stage, it has disadvantages such as high suture tension, slow healing, poor postoperative recovery, and easy recurrence.

In elderly patients, the application of this surgical procedure has certain limitations. Due to degenerative changes such as collagen loss and abdominal wall muscle atrophy, the strength and elasticity of abdominal wall tissues in elderly patients significantly decrease, leading to frequent postoperative pain. Coupled with high suture tension, it may also cause poor wound healing or hernia recurrence. Zhang Kunlei [5] and other studies have shown that compared with young patients, elderly patients have a higher recurrence rate after tension hernia repair, which is closely related to the physiological characteristics of their abdominal wall tissues. Nevertheless, for patients in special situations, such as partial incarcerated hernias, combined intestinal obstruction, severe local contamination, etc., traditional tension repair is still a more appropriate choice. Because of its simple operation and no need for artificial materials, the risk of infection is relatively low to a certain extent.

3.2. Tension-Free Hernia Repair

Due to the disadvantages of traditional tension hernia repair, such as high suture tension, poor postoperative recovery, pain, and easy recurrence, it is currently less commonly used. In order to avoid excessive incision tension, in 1989, American professor Lichtenstein first proposed the theory of tension-free hernia repair. The principle of the Lichtenstein procedure is to strengthen the posterior wall of the inguinal canal with an artificial mesh, thereby avoiding excessive traction on the abdominal wall tissues in traditional surgery [8]. This surgical method places a patch in the defect site of the inguinal region to cover the hernial ring and reinforce the weak area. The foreign body stimulation of the patch promotes the ingrowth of fibrous tissue in the body, further enhancing the strength and stability of local tissues, thus forming a more solid repair effect. It can also significantly reduce postoperative pain and discomfort. Moreover, with the development of medical technology, patch materials have evolved from early non-absorbable materials to modern absorbable or composite materials with better biocompatibility, further improving the safety and effectiveness of the surgery.

Tension-free hernia repair has significant advantages in the application for elderly patients, especially in reducing the recurrence rate and alleviating postoperative pain. In the analysis of the application value of tension-free hernia repair in the treatment of elderly patients with unilateral inguinal hernia by Li Zhixue [9] and others, the study group adopted tension-free hernia repair, and the control group adopted traditional hernia repair. The results showed that the operation time, first ambulation time, hospital stay, and postoperative complications of the

study group were significantly shorter than those of the control group, and the pain scores on the 1st, 3rd, and 7th days after surgery were significantly lower than those of the control group, indicating that this surgical method has significant clinical efficacy in elderly patients with unilateral inguinal hernia. In addition, compared with traditional tension hernia repair, tension-free repair has more lenient requirements for patients' physical conditions. It disperses abdominal pressure through the patch, reducing the risk of hernia recurrence and postoperative chronic pain, which is especially suitable for elderly patients with multiple chronic diseases. Studies have shown that tension-free repair can significantly shorten the operation time, reduce intraoperative blood loss, and has a low postoperative recurrence rate and mild pain [10], which makes it one of the ideal choices for elderly patients with inguinal hernia. Moreover, the operation is relatively simple with a short learning curve, making it suitable for promotion and implementation in medical institutions at all levels. However, open surgery still has disadvantages such as large incision wound, easy occurrence of incision infection and local hematoma after surgery, which often make patients refuse surgery.

3.3. Minimally Invasive Laparoscopic Hernia Repair

With the continuous development of the minimally invasive concept and laparoscopic techniques, laparoscopic techniques have gradually become the dominant approach in inguinal hernia repair, marking the entry of inguinal hernia treatment into the "minimally invasive era". Laparoscopic inguinal hernia repair has advantages such as small incisions, mild postoperative pain, rapid recovery, low recurrence rate, and fewer postoperative chronic pain and complications [11] [12], mainly including: 1) Intraperitoneal onlay mesh technique (IPOM); 2) totally extraperitoneal approach (TEP); 3) transabdominal preperitoneal approach (TAPP). For adult inguinal hernias, the commonly used hernia repair methods are mainly TAPP and TEP, both of which follow the principle of tension-free repair but have different operation paths. TAPP and TEP can reduce early postoperative pain, chronic pain, hematoma, wound infection, and time to return to work [10]. The technical core of TEP lies in establishing the extraperitoneal space and placing the mesh behind the transversus abdominis fascia. Since it does not enter the abdominal cavity, the entire operation is completed entirely in the preperitoneal space, maintaining the integrity of the peritoneum, reducing interference with the abdominal cavity, and avoiding various complications caused by intra-abdominal operations [13]. However, the anatomical space in the TEP surgical area is small, the intraoperative operation space is limited, and it has higher requirements for surgeons, with a longer learning curve [14] [15]. TAPP fully enters the abdominal cavity, with an open surgical field, which is convenient for handling complex hernia sac conditions. Especially for patients with direct hernias, TAPP can effectively handle false hernia sacs and reduce the occurrence of postoperative complications [16]. At the same time, it can also detect contralateral occult hernias, treat bilateral hernias simultaneously, and discover other abdominal lesions, making it increasingly accepted and recommended by more surgeons [17]. For emergency repair of ingui-

nal hernias, TAPP is considered a safe, feasible, and effective technique [18]. These two surgical methods have minimal trauma, rapid recovery, a wide repair field of view, and both achieve tension-free repair through mesh placement, significantly reducing the risk of hernia recurrence, especially suitable for elderly patients with weakened abdominal wall strength and high intra-abdominal pressure [19]. However, laparoscopic surgery requires general anesthesia, and elderly patients often have multiple underlying diseases, such as hypertension, diabetes, chronic obstructive pulmonary disease, etc., which increases the risk of anesthesia. In addition, laparoscopic surgery requires the establishment of an artificial pneumoperitoneum. If the pneumoperitoneum pressure is too high, it can have adverse effects on the patient's respiratory, circulatory, and nervous systems [20], so it has higher requirements for the cardiopulmonary function of elderly patients. Therefore, before surgery, it is necessary to fully assess the patient's overall condition and select an appropriate surgical method to ensure the safety of the operation.

4. Non-Surgical Treatment

Once an adult inguinal hernia is formed, it cannot heal spontaneously, and surgery is the only way to cure it. However, elderly patients with multiple chronic diseases often cannot tolerate surgery, which has high surgical risks and low therapeutic benefits. Except for cases where life-threatening complications such as incarcerated hernia or intestinal obstruction occur and require surgical treatment, these patients usually receive non-surgical treatment. The commonly used method is hernia belt compression. Through external compression, the hernia content is reduced into the abdominal cavity and prevented from protruding again, thereby temporarily relieving the local discomfort caused by the hernia sac protrusion. However, this method cannot fundamentally solve the problem of hernia sac protrusion. Long-term wearing may lead to local circulatory disorders, causing skin compressive injuries, even skin ulcers or infections, and can also affect digestive function [21]. Therefore, the use of hernia belts has certain limitations, and excessive dependence or improper use should be avoided during application. Studies have shown that hernia belts can only be used as temporary measures, cannot replace surgical treatment, and their long-term effects have not been fully verified [2]. Therefore, when choosing non-surgical therapy, the patient's condition should be comprehensively evaluated, and the disease progression should be monitored to ensure safety and effectiveness.

5. Factors Influencing Treatment Choices for Elderly Patients

5.1. Comorbidities, Physical Condition and Life Expectancy of Patients

Elderly patients often suffer from multiple chronic diseases, which significantly influence the choice of treatment for inguinal hernia. Cardiovascular diseases such as hypertension and coronary heart disease can lead to intraoperative hemodynamic instability, increasing the risks of anesthesia and surgery, and significantly

affecting surgical tolerance and postoperative recovery. In addition, patients with respiratory diseases such as chronic bronchitis, emphysema, and chronic obstructive pulmonary disease (COPD) have excessive sputum and difficulty in expectoration, leading to an increased incidence of postoperative pulmonary infections, thus influencing surgical decisions. It has been reported that in elderly patients with inguinal hernia, the incidence of postoperative complications in those with respiratory diseases is significantly higher than that in those without such diseases [22]. Patients with renal insufficiency or long-term use of anticoagulants have limited surgical options due to the high risk of intraoperative bleeding. For elderly patients with cardiovascular diseases, although laparoscopic surgery has the advantage of minimal invasion, the risks of surgery and anesthesia need to be carefully evaluated. Choosing open tension-free hernioplasty, which is relatively simple in operation and has lower requirements for anesthesia, may be more appropriate. For patients with immunocompromise such as diabetes mellitus, the risk of postoperative incision infection is high. It is recommended to use patch materials with strong anti-infection ability, strengthen blood glucose control, and use antibiotics prophylactically if necessary. In addition, the physical condition and life expectancy of elderly patients are also important factors determining the treatment modality. For patients with poor physical condition and short life expectancy, it is advisable to choose less invasive and lower-risk treatment methods, such as the use of hernia belts in conservative treatment, to reduce the impact on quality of life. For those with limited life expectancy, radical surgery should not be overly pursued to avoid increasing the incidence of postoperative complications and mortality. Therefore, when formulating a treatment plan, it is necessary to comprehensively evaluate the patient's physical condition, balance the risks and benefits of surgery, and select the most suitable treatment modality.

5.2. The Economic Conditions of Patients

Economic status is an important factor influencing the choice of treatment for elderly patients, especially when there is a significant difference in surgical costs. For example, although laparoscopic hernia repair has the advantages of minimal trauma and rapid recovery, it is more expensive. Elderly patients with limited financial resources may prefer lower-cost open surgery, even though the latter has a longer recovery time and more complications. Studies have shown that economic conditions are one of the important reasons why some patients abandon surgical treatment [23]. Therefore, when formulating treatment plans, doctors need to consider the patient's economic affordability in addition to their physical condition, so as to provide the most cost-effective option.

5.3. The Experience of Surgeons and Hospital Conditions

The experience of surgeons, hospital equipment, and the proficiency of technical teams significantly influence treatment choices for patients. Surgeons vary in their proficiency with specific surgical approaches, as well as in their ability to assess

surgical risks and manage complications, which directly affects surgical safety and outcomes. Although laparoscopic hernia repair is advanced and effective, it has a steep learning curve, and some surgeons prefer traditional open surgery [24]. Additionally, laparoscopic hernia repair relies on advanced medical equipment and high-end technical teams, which are unavailable in most primary-level hospitals. Outdated equipment, technical limitations, and shortages of skilled personnel restrict elderly patients' access to minimally invasive surgery [23]. Furthermore, the support capabilities of departments such as anesthesiology and intensive care units also impact the feasibility and safety of surgery. Therefore, when formulating treatment plans, it is essential to comprehensively consider surgeons' experience and hospital conditions to ensure patients receive optimal care.

Therefore, the treatment of inguinal hernia in the elderly should comprehensively consider factors such as the patient's physical condition, economic status, surgical experience, and medical conditions to formulate personalized treatment plans, so as to improve the therapeutic effect and quality of life.

6. The Selection of Different Patch Materials

Mesh is an indispensable part of tension-free hernia repair, and the selection of mesh has an important impact on the surgical effect. The application of mesh can not only strengthen the abdominal wall strength but also promote tissue healing. However, different types of meshes slightly differ in their working principles.

6.1. Polypropylene Mesh

Polypropylene mesh is widely used in various hernia repair surgeries due to its high tensile strength and good tissue integration ability [25]. However, it has poor biocompatibility, is prone to causing infections, and has a high surface roughness, which can stimulate surrounding tissues to produce excessive scar tissue, leading to chronic inflammation. These limitations restrict its application in some elderly patients or those with immune deficiency. Studies have shown that pure polypropylene mesh can cause severe complications such as intra-abdominal adhesions, intestinal obstruction, and intestinal perforation [26]. Therefore, pure polypropylene mesh without anti-adhesion properties is not allowed to be placed in the abdominal cavity. Heymann [27] and other studies found that after implantation of polypropylene mesh, it may trigger an inflammatory granulomatous reaction related to the implanted material, typically manifested as local inflammatory response. Patients may experience discomfort or pain, and in severe cases, it may lead to infections, delayed wound healing, and other related complications.

6.2. Polyester Patch

The polyester patch is synthesized from para-xylene and terephthalic acid. It features strong flexibility, arbitrary tailoring, and high-temperature resistance for disinfection, offering high flexibility in surgical operations [28]. However, the polyester patch has poorer anti-infection ability than the polypropylene patch. More-

over, with the passage of time after surgery, the instability of polyester materials, such as degradation and loss of elasticity, will further increase the risks of infection, foreign body reaction, and inflammatory reaction [29]. Therefore, when selecting polyester patches, the specific conditions of patients and surgical needs should be comprehensively considered.

6.3. Expanded Polytetrafluoroethylene Patch (ePTFE Patch)

The expanded polytetrafluoroethylene (ePTFE) patch features a smooth surface, strong hydrophobicity, and a negative charge, which minimizes adhesion when in contact with abdominal organs and reduces postoperative complications. However, due to its inert polymeric material properties, tissue ingrowth is difficult, leading to poor firmness and anti-infective ability of the patch after repair, thus affecting long-term fixation effects [30]. Additionally, its small pore size hinders the penetration of inflammatory cells, increasing the risk of infection [31]. Although it has advantages in specific scenarios such as contaminated wound repair, its high cost and complex operational requirements limit its widespread application.

6.4. Bioabsorbable Patch

In recent years, significant progress has also been made in the research of bioabsorbable patches. Such patches have good biocompatibility [32], can gradually degrade and be absorbed by the human body over time, and have a low foreign body reaction rate, which can reduce postoperative chronic pain and foreign body sensation [33], thereby avoiding complications possibly caused by long-term foreign body retention. For elderly patients, this material reduces the possibility of postoperative complications. However, biological patches have low strength, and the mesh is prone to rupture [34]. In addition, their high cost and high technical requirements have limited their wide clinical promotion to a certain extent.

6.5. Composite Patch

To compensate for the shortcomings of hernia repair materials with single-material structures, composite patches have emerged, aiming to achieve the goal of combining strength and biocompatibility by integrating the advantages of different materials. Liang Hongwei [35] and other studies reported that the self-fixing polypropylene/polylactic acid composite patch formed by combining the high tensile strength of polypropylene with the degradability of polylactic acid, when applied in laparoscopic hernia repair, can not only effectively enhance the strength of the abdominal wall, but also promote tissue healing and reduce foreign body reactions, with short operation time, less postoperative pain, and low incidence of complications and foreign body sensation. The titanium-coated composite patch is covered with a titanium film on the surface, which can not only improve the anti-infective ability and tissue integration ability, but also reduce the occurrence of postoperative seroma [36]. There is also a new hernia repair device launched

by Johnson & Johnson in the United States—the Ultra Pro Hernia System. The device inherits the partially absorbable characteristics of Vypro II, which is not only easy to operate, but also can significantly improve patient comfort and reduce foreign body sensation [37]. These innovative designs have laid a solid foundation for the application of composite patches in inguinal hernia repair, but their complex preparation process and high cost have limited their popularization and application to a certain extent.

7. Applications of Different Patches

The selection of patches depends on their material properties, biocompatibility, and mechanical characteristics. For young and active patients, high-strength synthetic patches such as polypropylene patches are preferred to reduce the risk of recurrence. In elderly patients, due to weakened abdominal wall strength, multiple underlying diseases, and poor tissue healing ability, biological patches offer advantages due to their excellent tissue integration and low infection risk. Composite patches are recommended for giant hernias or recurrent hernias, as they combine the advantages of multiple materials. In cases with high infection risk, polyester or expanded polytetrafluoroethylene (ePTFE) patches with smooth surfaces and low adhesion properties can be selected. In summary, patch selection requires comprehensive evaluation of factors such as age, hernia size, infection status, surgical environment, and patient economic conditions. Future research should focus on developing new materials with higher cost-effectiveness and further optimizing their performance to meet the special needs of elderly patients and achieve individualized treatment.

8. Anesthesia Management for the Perioperative Period of Inguinal Hernia in Elderly Patients

8.1. Preoperative Anesthesia Precautions

8.1.1. Assessment of the Patient's Physical Condition

Before anesthesia, a comprehensive assessment of the patient's physical condition and underlying diseases is crucial. This includes cardiovascular diseases such as hypertension and coronary heart disease, as well as respiratory conditions like chronic obstructive pulmonary disease (COPD) or bronchial asthma. These underlying diseases not only increase the risks of anesthesia but may also affect surgical outcomes. Therefore, relevant preoperative examinations should be completed, such as electrocardiogram (ECG), blood pressure monitoring, echocardiography, pulmonary function tests, arterial blood gas analysis, and chest imaging. Additionally, liver and kidney functions play a key role in the metabolism of anesthetic drugs. Due to the natural decline of liver and kidney functions in the elderly, drug metabolism may slow down, increasing the risk of anesthetic drug accumulation [38]. Preoperative assessment of liver and kidney functions should be thorough. If abnormalities are detected, the types and dosages of anesthetic drugs need to be adjusted according to specific conditions.

8.1.2. Investigation of Medication Use

Elderly patients often take multiple medications for a long time, such as antihypertensives, anticoagulants, hypoglycemics, etc. These medications may have synergistic or antagonistic effects with anesthetic drugs. A detailed understanding of the patient's medication use before surgery is a key step to ensure the effect of anesthesia. For example, anticoagulant drugs may increase the risk of intraoperative bleeding, while β-blockers may affect the cardiovascular effects of anesthetic drugs [39]. Therefore, it is necessary to comprehensively review the patient's medication list before surgery and adjust the medication plan as needed. In addition, for patients using medications that may affect the effect of anesthesia, communication with the attending physician should be made in advance to formulate an individualized anesthesia plan.

8.1.3. Psychological Status Assessment and Counseling

During the perioperative period, elderly patients often experience psychological problems such as anxiety, fear, and depression. These negative emotions may further exacerbate physiological stress responses and increase the risks of anesthesia. Preoperative psychological counseling should be conducted, and common methods include preoperative visits, health education, and psychological support. Through face-to-face communication with patients, their questions about surgery and anesthesia should be answered to alleviate fear, and relevant knowledge should be popularized to help them establish correct cognition [40].

8.2. Selection of Anesthesia Methods

8.2.1. Local Anesthesia

Local anesthesia has significant advantages in inguinal hernia surgery for elderly patients, featuring simple operation, minimal interference, and fewer postoperative complications. Studies have shown that local infiltration anesthesia can shorten the operation time, ambulation time, and hospital stay, while effectively reducing adverse anesthetic reactions [41] [42]. Local nerve block anesthesia, by infiltrating subcutaneous nerves, iliohypogastric nerves, ilioinguinal nerves, etc. layer by layer, can provide good analgesic effects and maintain hemodynamic stability [43]. However, local anesthesia may require additional drugs for complex surgeries, presenting certain limitations. It is suitable for elderly patients with good physical condition and low surgical difficulty, especially for short procedures such as tension-free hernia repair.

8.2.2. Intravertebral Anesthesia

Intravertebral anesthesia includes epidural anesthesia and spinal anesthesia, which achieve analgesic effects by blocking spinal nerve roots while preserving the patient's consciousness. However, in elderly patients, degenerative changes such as spinal hyperosteogeny and ligament calcification increase the difficulty of implementation, potentially causing adverse reactions such as blood pressure fluctuations, cardiopulmonary function depression, postoperative nausea and vomiting, and urinary retention. Although continuous epidural anesthesia can meet surgical

needs, it has a significant impact on hemodynamics, which may prolong the postoperative recovery time. Nevertheless, intravertebral anesthesia still has irreplaceable value in surgeries requiring muscle relaxation or in patients with severe respiratory diseases. When making a choice, the patient's anatomical characteristics and physiological function status should be fully considered, and measures should be taken to reduce the risk of complications.

8.2.3. General Anesthesia

General anesthesia suppresses the central nervous system, causing loss of consciousness, analgesia, and muscle relaxation in patients, making it suitable for complex or prolonged surgeries. However, elderly patients have higher risks of general anesthesia due to reduced drug metabolism and organ function decline, which may lead to complications such as postoperative delirium and respiratory depression. To reduce risks, it is necessary to select appropriate anesthetic drugs and dosages based on the patient's condition and strictly control the depth of anesthesia. In recent years, the application of new anesthetic drugs such as sevoflurane has significantly improved the safety and controllability of general anesthesia. For example, the combination of dexmedetomidine and ropivacaine under sevoflurane anesthesia has shown excellent analgesic effects and reduced postoperative adverse reactions [38]. Therefore, when using general anesthesia in elderly patients, the type of surgery, the patient's underlying condition, and the experience of the anesthesia team should be comprehensively considered to ensure the smooth progress of the surgery.

8.3. Intraoperative and Postoperative Anesthesia Precautions

In elderly patients, the clearance rate of anesthetic drugs is reduced, making them prone to drug accumulation and toxic reactions. Therefore, attention should be paid to dosage adjustment and control of the administration speed to avoid adverse reactions caused by the decreased drug metabolism capacity. During surgery, vital signs should be continuously monitored and the depth of anesthesia should be regulated. The management of the postoperative anesthesia recovery period should not be ignored, such as the treatment of complications like nausea, vomiting, respiratory depression, and urinary retention. Antiemetic drugs should be used rationally, such as ondansetron or metoclopramide. Early postoperative feeding should mainly consist of light and easily digestible foods, which helps to reduce the burden on the gastrointestinal tract and lower the incidence of nausea and vomiting. After surgery, respiratory rate, oxygen saturation, and arterial blood gas analysis results should be closely monitored [39] to promptly detect and address abnormalities in respiratory function. Urinary retention is often related to intraspinal anesthesia or surgical stimulation of pelvic nerves. It not only increases patient discomfort but may also lead to complications such as urinary tract infections, affecting postoperative recovery. Preoperative assessment of the patient's micturition function should be conducted, excessive traction of pelvic tissues should be avoided during surgery, and catheterization should be promptly

performed after surgery [44] [45].

9. Individualized Treatment Strategies

The core of individualized treatment strategies lies in formulating the optimal treatment plan based on patients' individual differences, a concept that is particularly important in the treatment of inguinal hernias in elderly patients. As elderly patients often have multiple underlying diseases, such as hypertension, diabetes, and chronic obstructive pulmonary disease, these factors significantly increase the complexity of treatment. Therefore, considering the unique physiological conditions of elderly patients and comprehensive evaluation of their specific conditions, selecting the most suitable treatment plan has become a key direction in current medical research. Additionally, individualized treatment must fully consider patients' economic status and social support systems. Most elderly patients with poor economic conditions may prefer lower-cost traditional surgical methods, often ignoring their long-term efficacy and rehabilitation quality. With the popularization of precision medicine concepts, technologies such as genetic testing and big data analysis to assess individual differences have provided new ideas for personalized treatment. By analyzing patients' genetic backgrounds and metabolic characteristics, it is possible to predict their responses to specific treatments and further optimize treatment decisions [46]. Thus, when formulating treatment plans, physicians should comprehensively consider patients' physical conditions, economic circumstances, and the hospital's technical capabilities, providing practical recommendations to maximize the benefits of inguinal hernia treatment in elderly patients and deliver higher-quality, personalized medical services.

10. Conclusion

The treatment options for inguinal hernias in elderly patients are diversified due to individual differences, the experience of surgeons, and hospital conditions. Each treatment method has its unique advantages, disadvantages, and applicable scenarios. Due to the defects of high suture tension, poor postoperative recovery, and high recurrence rate, traditional tension herniorrhaphy is currently only used in special cases such as incarcerated hernias, combined intestinal obstruction, and severe local contamination. Open tension-free hernioplasty is widely applied in primary hospitals due to its relatively simple operation and low requirements for the physical conditions of elderly patients. However, the incidence of complications such as incision infection and hematoma still needs attention. Although laparoscopic hernioplasty has significant advantages such as minimal invasion and rapid postoperative recovery, its high technical requirements and anesthesia risks make it difficult to popularize in some primary hospitals. Conservative treatments such as hernia belts are suitable for patients who cannot tolerate surgery or have mild symptoms, but their long-term effects are limited. In conclusion, when making treatment decisions, it is necessary to comprehensively consider individual factors such as the patient's comorbidities, physical condition, and life expectancy,

economic status, the surgeon's experience and hospital conditions, as well as the selection of appropriate patches and anesthesia methods. This approach provides more scientific and personalized choices for the treatment of inguinal hernias in elderly patients, thereby significantly improving the level of treatment and effectively enhancing the quality of life of patients.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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