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ORYGINALNY ARTYKUŁ NAUKOWY

ANALYSIS OF SURGICAL PROCEDURES IN PEOPLE OF GERIATRIC AGE

ANALIZA ZABIEGÓW CHIRURGICZNYCH WYKONYWANYCH U OSÓB W PODESZŁYM WIEKU

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Summary

Background. The aim of the study was analysis of the type of surgical operations conducted in geriatric age patients and factors impacting wound healing and the well-being of seniors.

Material and methods. The study was conducted from July 2022 to April 2023, involving a group of 209 participants residing in surgical wards. The selection criteria included being aged 65 years and above, having gone through a surgical operation and allowing access to full medical records. The study used a self-developed questionnaire, as well as standardized scales:

VAS, SGA and SSCh. The verification for existing relationships was conducted using the Chi-square test, with a statistical significance set at $p=0.05$.

Results. The majority of the participating sample were males (N=125; 58.81%), and aged 79 and above (N=146; 69.85%). No microbiological test was conducted prior to the surgery in the majority of the participants (N=203; 97.13%). The most common procedures conducted were hernia surgeries (N=48; 22.97%) and proctologic procedures (N=46; 22.00%). Prior to the procedure, the skin was clean (N=150; 71.77%). The surgery was most often performed on patients above the age of 79 years (N=146; 69.85%).

Conclusions. The number of conducted surgical operations increases with age. The procedures most commonly carried out on senior patients are planned hernia surgeries and proctologic procedures.

Keywords: surgical operation, geriatrics, seniors, wound, well-being

Streszczenie

Wprowadzenie. Celem pracy była analiza rodzajów zabiegów chirurgicznych wykonywanych u pacjentów w wieku podeszłym oraz czynników wpływających na gojenie się rany i samopoczucie seniorów.

Material i metody. Badania prowadzono od lipca 2022 do kwietnia 2023 roku na grupie 209 osób przebywających na oddziałach chirurgicznych. Kryterium doboru był wiek powyżej 65 r.ż., wykonanie zabiegu chirurgicznego oraz możliwość skorzystania z pełnej dokumentacji medycznej. Do badania wykorzystano ankietę własną oraz standaryzowanych skal: VAS, SAG i SSCh. Weryfikację występowania zależności przeprowadzono przy wykorzystaniu testu chi-kwadrat. Przyjęto poziom istotności $p=0.05$.

Wyniki. Większość uczestniczącej próby stanowili mężczyźni (N=125; 58,81%) oraz osoby w wieku 79 lat i starsze (N=146; 69,85%). Przed zabiegiem u większości uczestników (N=203;

97,13%) nie przeprowadzono badania mikrobiologicznego. Najczęściej przeprowadzanymi zabiegami były operacje przepukliny (N=48; 22,97%) i zabiegi proktologiczne (N=46; 22,00%). Przed zabiegiem skóra była czysta (N=150; 71,77%). Operację najczęściej przeprowadzano u pacjentów w wieku powyżej 79 lat (N=146; 69,85%).

Wnioski. Wraz z wiekiem zwiększa się liczba wykonywanych zabiegów chirurgicznych. Najczęściej wykonywanymi u seniorów zabiegami są planowe operacje przepuklin i zabiegi proktologiczne.

Słowa kluczowe: zabieg chirurgiczny, geriatryka, osoby starsze, rana, samopoczucie

Introduction

The term surgical risk is defined as the likelihood of serious complications or death of patients occurring during general anesthesia, surgery or directly afterwards [1,2]. In older people, every surgical procedure may involve the occurrence of complications. One of the main threats is cardiovascular disease, because seniors are at risk of decreased physiological heart reserve [3]. Age is also a very significant risk factor for the most common clinical occurrences of nervous system diseases [3].

The patient's body mass, which is known to change with the progressive aging of the organism, may cause possible complications. Obesity is increasingly more common among the elderly, especially given that pharmacotherapy is not an advised course of treatment for people above 65 years of age [4].

Another threat is malnutrition (most often the protein-energy content), resulting from inadequate supply, incorrect absorption or excessive depletion of nutrients. As the food reserves of the group in question are higher, any further strain, such as infection, injury or surgical operation may lead to hypoalbuminemia and related swelling [5].

Additionally, changes in the immune system, involving progressive parenchymatous organ degeneration, also develop with age. Cellular immunity, for which T lymphocytes are primarily responsible, weakens. In this period, cytokines regenerate more slowly, resulting in a weaker reaction to antigens [2]. The antioxidant system capacity changes as well, which is accompanied by an increase in free radicals in the blood and tissues. The changes in enzyme activity, non-enzyme system component shortages, and the impairment of the recovery system pave the way for many disorders [4].

Genitourinary disorders, including chronic kidney failure [5] and urinary incontinence, also present further, clinically significant concerns [6].

One of the most important medical issues is age-related dementia, which disrupts cognitive functioning, language abilities, as well as the capability to compare, evaluate and make decisions [7].

As may be inferred, characteristic changes in the physiological processes occur in all internal organs with age. Illnesses in the elderly run a different course than in younger people, which forces treatment options to be modified. However, age is not a criterion that excludes surgical interventions altogether. On the other hand, it is a factor tightly related to comorbidity, which significantly limits and complicates the possibility to conduct surgery and impacts the rate of subsequent, post-op complications [8]. Therefore, studies regarding the specifics of procedures conducted on geriatric patients, including their course and consequences, would seem to be of particular relevance. The data obtained should serve to develop standards of care for geriatric surgical patients.

The aim of the study was the analysis of the type of surgical operations conducted in geriatric age patients and factors impacting wound healing and well-being of the seniors.

Material and methods

The study was conducted from July 2022 to April 2023, involving a group of 209 participants, including 125 males (58.81%) and 84 females (41.19%) residing in surgical wards of hospitals in Lower Silesia, Poland.

The selection criteria included being aged 65 years and above, having gone through a surgical operation and allowing access to full medical records (patient's medical history, surgical nurse's protocol, observation forms from the recovery room, information from visits at the surgical clinic). The study used a self-developed questionnaire consisting of 17 questions which asked about the collected swabs of skin before and after the surgical operation, the type of anesthesia administered, the technology used during the operation, the location of the surgery, the state of the skin before and after the procedure, the type of incision made and its state after the operation, the drain or lack thereof in the wound, the type of dressing applied, the duration of the patient's stay in the recovery room and the surgical ward, the appearance of the wound and the dressing in the recovery room, the ward, the surgical clinic and until the stitches are removed.

The analysis also used the following standardized scales: the Visual Analog Scale (VAS), the Subjective Global Assessment of Nutritional Status (SGA) and the Surgical Safety Checklist (SSCh) recommended by WHO.

The verification for existing relationships was conducted using the Chi-square test, with statistical significance set at $p=0.05$.

Results

The majority of the participants were male (N=125; 58.81%), aged 79 and above (N=146; 69.85%), followed by people between the ages of 70 and 79 years (N=46; 22.00%), while the smallest group consisted of participants aged between 65 and 69 years (N=17; 8.13%). No microbiological test was conducted prior to the surgery in the majority of the participants (N=203; 97.13%). 98 (46.88%) seniors were administered spinal anesthesia. 86 (41.14%) had general anesthesia. 19 (9.09%) had local anesthesia, and just 6 (2.89%) received analgesedation.

The most common procedures conducted were inguinal and abdominal hernia surgeries (N=48; 22.97%) followed by proctologic procedures such as anal fissure/fistulae and hemorrhoids (N=46; 22.00%), laparoscopic cholecystectomy (N=33; 15.79%), lower limb procedures (varices, amputation – N=31; 14.83%), laparotomy (stomach ulcer, bowel obstruction – N=19; 9.09%) and, in equal numbers, skin lesion procedures (warts, suspicious hyperpigmentation of the skin), procedures for the upper limb area (ganglion, Dupuytren's contracture), breast area (removal of a quadrant or the whole breast) and the thyroid (removing 1 or 2 lobes) (each N=8; 3.81%).

The most common location of the surgery was the abdominal cavity (N=67; 32.05%), involving complex incisions (N=36; 17.22%) and midline incisions in the upper and lower abdomen, vertical, on the lower left side and in the navel area (N=31; 14.83%). This was followed by procedures for the rectum (N=44; 21.05%), lower limb (N=33; 15.79%), back (N=23; 11.00%), groin and chest (N=13; 6.22% each), upper limb and back (N=8; 3.84% each).

The state of the skin prior to the surgery was examined for the purpose of the present analysis. The skin was most often clean and shaved (N=150; 71.77%), but lack of hygiene was apparent in 33 people. 10 patients (4.78%) had purulent changes after previous shaving. 8

(3.83%) presented other noticeable skin lesions, and 8 patients (3.83%) were not shaved in the area where the surgery was to be conducted. In all cases (N=209; 100%) the patient's skin was disinfected prior to the surgical operation.

No drain was inserted in most of the participants (N=142; 67.94%). 48 (22.97%) had a Redon drain in the wound, and 19 (9.09%) had a Pezzer catheter inserted. A majority of the operated seniors (N=136; 65.07%) were given occlusive dressing, while 73 (34.93%) received dressings consisting of swabs, gauze or drains.

Most often, the patients stayed in the recovery room for more than 12 h (N=163; 77.99%), and the applied dressing looked normal (N=163; 77.99%), which allowed them to leave the ward within 24 to 72 hours post-surgery (N=184; 88.03%) and attend their first visit in the surgical clinic within 7-10 days after surgery (N=165; 78.94%). In most cases, there was no need to collect skin swabs from the patients (N=188; 89.95%), because the wound looked correct (N=186; 88.99%), resulting in stitches being removed within 7-10 days post-surgery (N=167; 75.11%).

In the six months leading to the surgery, the majority of the participants did not experience weight loss (N=184; 88.03%), but 21 people (10.04%) lost 10 kg, and 4 people (1.93%) lost more than 10 kg.

Most of the participants did not have any digestive system symptoms (N=180; 86.12%), while 16 (7.66%) suffered vomiting, and 13 (6.22%) had sitophobia.

According to the Subjective Global Assessment of Nutritional Status (SGA), most of the seniors had proper nutrition (N=186; 88.99%), while in 23 (11.00%) cases, there was suspected or moderate malnutrition.

On the VAS scale, 140 patients (66.98%) experienced moderate pain; 40 (19.14%) were in severe pain, and 29 (13.88%) had mild pain.

On the basis of the Surgical Safety Checklist (adapted from WHO) it was concluded that 186 (88.99%) seniors had planned surgery, and in 23 cases (11.01%) the surgery was due to a sudden emergency.

In 186 (88.99%) participants, the location of the surgery was marked. 150 (71.77%) people declared not to have any allergies, and in those people who did, it was mostly a reaction to medicines (N=105; 50.24%), food (N=68; 32.54%) or contact allergy (N=36; 17.22%).

In all cases, the identity of the patient was confirmed, the anesthesia risk assessment was carried out, and the possible, foreseeable complications in keeping up airway patency were taken into account, as was the risk of acute aspiration of gastric content. ECG, pulse oximetry, blood pressure measurement and capnography were conducted. The proper position of the patient was established and the evaluation of their state before being transported from the operating theater to the recovery room/ward was recorded.

The conducted analysis also determined whether the age of the patient would have any effect on the type of surgical operation administered (Table 1), and whether collecting a skin swab prior to the procedure might have any effect on its healing progress in the surgical ward (Table 2).

Table 1. Type of administered surgical procedure depending on the age of the patient

Type of surgical operation		Age			Test result
		65-69 years	70-79 years	>79 years	
Hernia	N	7	10	31	$\chi^2=13.65$ $df=16$ $p=0.62$
	%	14.58	20.83	64.59	
Lower limb	N	0	8	23	
	%	0.00	25.81	74.19	
Laparotomy	N	2	4	13	
	%	10.53	21.05	68.42	
Laparoscopic cholecystectomy	N	5	8	20	
	%	15.15	24.24	60.61	
Proctologic procedures	N	3	10	33	
	%	6.52	21.74	71.74	
Skin lesion	N	0	0	8	
	%	0.00	0.00	100.00	
Upper limb	N	0	2	6	

	%	0.00	25.00	75.00	
Breast tumors	N	0	2	6	
	%	0.00	25.00	75.00	
Thyroid	N	0	2	6	
	%	0.00	25.00	75.00	
Overall	N	17	46	146	
	%	8.13	22.00	69.87	-

Notes: X^2 – test statistic; df – degrees of freedom; p – statistical significance.

Table 2. Wound healing assessment depending on skin swab sample collection

Appearance of the wound on the surgical ward		Skin swab collection		Test result	
		Yes	No		
Correct	N	8	136	$X^2=1.411$ $df=4$ $p=0.841$	
	%	5.56	94.44		
Leakage	N	0	8		
	%	0.00	100.00		
Bleeding	N	0	21		
	%	0.00	100.00		
Redness	N	0	31		
	%	0.00	100.00		
Swelling	N	0	5		
	%	0.00	100.00		
Overall	N	8	201		-
	%	3.83	96.17		

Notes: X^2 – test statistic; df – degrees of freedom; p – statistical significance.

It was also determined whether the occurrence of pain and its intensity experienced by the senior patient impacted the duration of their stay in the recovery room (Table 3).

Table 3. Occurrence of pain and its intensity depending on the duration of the patient's stay in the recovery room

Duration of rest in the recovery room		Visual Analog Scale (VAS)			Test result
		Mild pain	Moderate pain	Severe pain	
None	N	0	2	0	$\chi^2 = 7.55$ $df = 8$ $p = 0.48$
	%	0.00	100.00	00.00	
2-4 h	N	0	2	0	

	%	0.00	100.00	0.00	
5-8 h	N	2	4	4	
	%	20.00	40.00	40.00	
9-12 h	N	3	25	4	
	%	9.37	78.13	12.50	
>12 h	N	24	107	32	
	%	14.72	65.64	19.64	
Overall	N	29	140	40	
	%	13.88	66.98	19.14	-

Notes: X^2 – test statistic; df – degrees of freedom; p – statistical significance.

Furthermore, it was established whether the mode of procedure (planned/emergency) had any effect on the dressing used (Table 4), and if the type of surgical operations affected whether or not a skin swab was collected in the surgical clinic (Table 5).

Table 4. Type of dressing used depending on the mode of procedure

Type of dressing used		Planned procedure	Emergency	Test result
Occlusive	N	127	8	$X^2=3.152$ $df=1$ $p=0.075$
	%	94.07	5.93	
Containing swabs/gauze/drains	N	59	15	
	%	79.73	20.27	
Overall	N	186	23	-
	%	88.99	11.01	

Notes: X^2 – test statistic; df – degrees of freedom; p – statistical significance.

Table 5. Swab collection at the surgical clinic depending on the type of surgical operation

Type of surgical operation		Swab collection in surgical clinic		Test result
		Yes	No	
Hernia	N	5	42	$X^2=24.489$ $df=8$ $p=0.003$
	%	10.64	89.36	
Lower limb	N	0	32	
	%	0.00	100.00	
Laparotomy	N	10	8	
	%	55.55	44.45	
Laparoscopic cholecystectomy	N	2	32	
	%	5.88	94.12	
Proctologic procedures	N	4	42	
	%	8.69	91.31	
Skin lesion	N	0	8	

	%	0.00	100.00	
Upper limb	N	0	8	
	%	0.00	100.00	
Breast tumors	N	0	8	
	%	0.00	100.00	
Thyroid	N	0	8	
	%	0.00	100.00	
Overall	N	21	188	
	%	10.05	89.95	-

Notes: χ^2 – test statistic; df – degrees of freedom; p – statistical significance.

Discussion

Senior patients suffer many risks related to the perioperative period, proper qualification for surgical intervention and anesthesia, properly performed surgery, and successful recovery. Although the patient's advancing age tends to cause greater morbidity and mortality during their stay in a surgical ward, this should not determine whether an elderly person qualifies for a surgical procedure. This is confirmed by a number of studies on people over the age of 65, which show that the number of complications in the postoperative period increases significantly, especially in seniors undergoing operations for cardiovascular reasons, gastrointestinal disorders and thoracic surgery patients [5,9].

For the purpose of this study, the researchers analyzed both the age of the patients and the type of surgery conducted. As many authors point out, more than half of senior patients undergo surgery in the final years of their lives due to the aging process of the body and the increased frequency of medical conditions that come with age [10,11]. This was confirmed by analyses that proved that the number of surgical operations conducted increases with age. The aforementioned is caused by the gradual process of body aging, which involves an increasing number of abnormalities, multimorbidity and associated polypharmacy. All of these factors contribute to an increased frequency of diagnoses made and often the need for surgical

interventions as a consequence. At the same time, the number of procedures conducted on senior patients proves that healthcare professionals do not exclude this group of patients from surgical interventions altogether just because of their age. In practice, this means that age is not a reason for rejecting surgery as a treatment option, so there is no occurrence of ageism (discrimination on the basis of age) to speak of [12].

The study group was predominantly male, which is for the most part probably due to the specific nature of the diagnosed issues, such as hernias, especially the inguinal kind, and rectal diseases. The obtained results are reflected in the related literature, with authors proving that such diseases are mostly diagnosed in men. Unfortunately, they are reported relatively late, due to the associated embarrassment or ignorance of the existing clinical symptoms. Such situations trigger the development of disease and results in a need for surgical intervention [9].

Rectal diseases are, to some extent, related to the age of those operated on. Some researchers have proven, for example, that the appearance of an anal fissure is accompanied by a local decrease in blood flow [13]. There is a gradual increase in systolic and diastolic pressure with age, which leads to the development of hypertension and results in the rise of impairing changes in the circulatory system [5]. The cause of the discomfort may be infections of the perianal area, infections of glands located within the anal crypts or the anoderm. Chronic inflammation leads to the accumulation of purulent contents in the intersphincteric area and the formation of abscesses. In most cases, anal fistula can also occur as a consequence of a cryptogenic infection caused by the bacteria in the large intestine. Meanwhile, the occurrence of a hernia is caused by excessive physical exertion involving the abdominal muscles, a chronic cough, often caused by smoking, or chronic respiratory illness and inflammatory diseases of the genitourinary system, persistent constipation and frequent urinary urgency, i.e. factors that predominantly affect the elderly. As a result, statistics show that one in five geriatric age patients

has had a proctologic procedure involving an abdominal or inguinal hernia [10,13], which has also been confirmed by the results obtained in the course of this study.

The study analyzed whether the elderly were receiving sufficient nutrition, which can influence some common medical conditions, an elderly person's overall state of health, and is particularly important in those who are scheduled to undergo surgery. The results obtained on the SGA scale showed that participants had good nutrition. However, according to the literature, the weight of people over 65 years of age begins to gradually decline, lean body mass decreases, and the amount of body fat can increase by up to 30%, concentrating mainly around internal organs and muscles. The metabolic rate (PPM) also decreases, in men by 1/5, and in women by about 1/12 [14].

The SGA scale used in the analyses showed suspected or intermediate malnutrition only in a small number of the study participants. Most of them did not record weight loss in the 6 months prior to the procedure. At the same time, weight loss is a common problem for geriatric patients, and it can cause deterioration and impairment of various functions, forcing the patient to be placed in a nursing home and increasing their risk of mortality. Malnutrition can also be one of the first clinical factors in the onset of Alzheimer's disease, so it is worth paying attention to this aspect when examining a patient. One study found that people who suffered a loss of over 10% of their body weight between the ages of 70 and 75 had a significantly higher risk of death during the next five years of their life than those whose body weight decreased by 5%. Malnutrition can lead to an increase in infections, bedsores and poorer response to medical treatment, which may cause muscle atrophy and accelerate the patient's loss of independence. The SGA scale, which is accredited by the Polish Society for Parenteral and Enteral Nutrition and Metabolism, determines the risk of malnutrition. Combined with their nutritional history, and anthropometric and biochemical tests, it provides a true picture of a geriatric patient's nutritional status. The obtained results showed a small number of underweight patients in the

sample, which positively impacts the scheduling rate of surgery and results in seniors being operated on in a generally good physical condition, while also improving wound healing [15].

The research conducted for the purpose of the present study found that the majority of procedures involving the elderly were performed as planned and classified as general surgery. Procedures performed for emergency reasons were a rare occurrence, which coincided with other researchers' reports on the matter [9,11,13] and is an optimistic piece of information, especially considering that these are the procedures that present the highest risks as far as surgery outcomes and anesthesia are concerned. In such cases, the most significant problem is the inability to collect a patient's detailed history during an interview and stabilize the general condition. Therefore, there is a relatively high (3 to 10 times higher than for young people) incidence of complications occurring with urgent procedures performed in the elderly for life-saving reasons. Therefore, in geriatrics, it is preferable to perform procedures on a planned basis, with optimized treatment depending on the patient's condition [16].

On the other hand, the occlusive dressing applied is usually used to secure uninfected wounds with little exudate. As proven by many analyses, such a dressing helps stop the bleeding, separate the wound from the external environment and strengthen the healing effect of the medications applied to the wound. Studies show that this type of dressing is durable, allows for proper wound ventilation, creates the optimal environment for its healing, minimizes the risk of its contamination or drying out, is comfortable to use, and thanks to the submersion in hydrogel, it adjusts to the shape of different body parts. For those reasons, as well as their universal nature, occlusive dressings are recommended for use among geriatric patients in a hospital setting, as well as at home [17].

The present research used the Surgical Safety Checklist, created by WHO. Its goal is to minimize the number of complications and deaths occurring in patients undergoing operation. The tool consists of three parts and addresses the period before anesthesia administration, the

period before the skin incision is made and the patient's condition before leaving the operating theater. While completing the first part, it is important to consider the actual condition of the elderly person when assessing the possibility of complications during the surgical procedure. These can occur because of the nature of the procedure (planned/emergency). A planned procedure should be carried out taking into account the principles of anatomy, physiology and surgical technique, in a careful manner that is non-traumatic to the tissues and causes as little bleeding as possible [12]. During surgery, incisional cuts are made, and trauma is limited to the separation of skin tissue, subcutaneous tissue and, in some cases, viscera. The tissues that make up the wound wall are not harmed. Therefore, fresh surgical wounds heal easily when their edges are brought closer together [18]. As mentioned above, only a small percentage of the analyzed procedures was performed as an emergency treatment. Planned surgery is characterized by the selection of an appropriate method and instruments that ensure maximum safety during the surgical operation. Cases of urgent procedures increase the possibility of additional complications, such as hemostasis and water-electrolyte disorders. In many cases of emergency procedures, drains are used, acting as a gateway for the spread and the development of surgical site infections [13]. The procedures analyzed for the purpose of the present study did not require such measures to be applied for the most part. Similar results were obtained by other researchers, proving that planned operations of geriatric age patients involve a significantly smaller number of complications compared to emergency procedures, which often require drainage to be performed [19].

Some of the most important issues to consider, as far as reducing the likelihood of error is concerned, are marking the surgical site, assessing the risk of bleeding, possibly preparing a blood pool, and collecting allergy data from the elderly patient. Studies have shown that the most common allergies found in seniors involve reactions to medications. These are particularly dangerous because they can lead to shock. Meanwhile, especially in cases where the risk of

contamination is high, it is necessary to perform perioperative antibiotic and anticoagulant prophylaxis [11,20]. In this case, both potential allergic reactions to medication and geriatric age patients being subject to polypharmacy have to be taken into account, as many publications report the possibility of more frequent medicine interactions occurring [21-24].

Studies have shown that the preferred type of anesthesia used in elderly patients was subarachnoid anesthesia. The advantages of this method include lower blood loss, greater intraoperative cardiovascular stability, reduced immune response, fewer thromboembolic complications, lower pain intensity and lower frequency of consciousness disturbance as compared to general anesthesia [6]. The additional use of the Visual Analog Scale (VAS), allowed a subjective evaluation of this discomfort to be made after surgery. According to the elderly, the most important for a patient after a surgical procedure is high-quality analgesia, since failure to effectively decrease pain leads to physiological and psychological complications. It is estimated that about 20% of patients experienced severe pain in the postoperative period and had a poor experience with pain control treatment during hospitalization [16]. Therefore, the task of modern medicine is to strive to provide each patient with effective analgesia after surgery, especially when extensive surgeries are performed. Conducting unprofessional analgesic treatment disrupts the body's homeostasis, and reduces the senior patient's well-being and quality of life [18,25].

The research conducted for the present study shows that patients in the recovery room had their analgesic therapy selected in an appropriate manner, and their stay in the post-anesthesia room depended on their level of pain – the stronger their pain, the longer their stay. The results obtained in this study are consistent with those of other researchers [26]. This allows for effective control through monitoring the vital parameters of the senior patient, which indicates the possibility of acute postoperative pain incidence, and the implementation of appropriate treatment, based on the principles of the analgesic ladder. In accordance with the

latter and WHO recommendations, non-opioid analgesics from the group of non-steroidal anti-inflammatory drugs (NSAIDs) and paracetamol are used first. Their simultaneous use significantly reduces the dose of each drug, effectively relieving acute postoperative pain, reducing the incidence of adverse symptoms, enabling better treatment and improving prognosis [11,18]. Only after their maximum doses are exhausted are opioids, which currently constitute the most common form of pain relief, administered. Medications are titrated and the duration of treatment is tailored to the individual patient's needs, resulting in the operated patient being transferred to a primary care unit in a generally good condition, with their pain under control and with specific recommendations given to promote continued pain relief [27].

An extremely important aspect of care after surgical intervention is the rapid healing of the wound, to which a properly applied and selected dressing contributes. One of the most important elements of wound healing is the absence of infection, which causes epithelialization inhibition. Clean surgical wounds heal by direct closure, through the use of surgical sutures. The proper process of interim healing involves epithelialization [25].

One of the elements of perioperative infection observation and care is microbiological surveillance. Its purpose is to analyze etiological agents and assess antibiotic vulnerability in various clinical forms. What is alarming is that the resistance of microorganisms to antibiotics, the factors of their formation, and the risks associated with invasive diagnosis and treatment are systematically increasing. These phenomena require professional control to be in place in hospital systems and the registration of such infections [28].

In the case of the present study, only a few patients had swabs collected prior to surgery. These results differ from those obtained in studies by Ruciński [29] and Boltz [30]. They showed that swab collection prior to the procedure should be an element of basic preparation for patients before planned treatments, especially among those at high risk, such as the elderly, because swab collection lowers the risk of UTI and other complications. According to the

literature, infections in general surgery patients occur at a rate of 2-30% and such complications are not only the cause of prolonged hospitalization, but also increase the treatment costs, show worse outcome predictions for the treatment and, above all, constitute a real threat to the health and life of the elderly patient. Risk factors for complications in surgery include age, the primary diagnosis and its comorbidities, nutritional status and immune system capacity, with most of the above relating to older patients. Exogenous infections are mainly gram-positive granulomas and fungi, while endogenous infections are usually caused by gram-negative bacilli, anaerobic bacteria and opportunistic fungi [11,31]. In cases where swelling and excessive soreness are observed, or erythema and wound exudate appears, the wound should be opened immediately and the secretion collected for bacteriological examination in search of aerobic and anaerobic cultures. Surgical wound infection for hernia entails severe, or even life-threatening, health consequences. Unfortunately, there are no existing recommendations to make collecting a skin swab prior to surgery the medical norm [32].

In the patients undergoing analysis, the majority of wounds appeared normal, even in cases where microbiological testing had not been performed prior to surgery. There were no seniors with wound leakage, redness or swelling, and if there were complications, for example in the form of bleeding, they affected only a small percentage of those operated upon. The result of the test ($p>0.05$) turned out to be statistically insignificant, so it was not concluded that taking a skin swab had any impact on subsequent wound healing. It could be assumed that the studied group of seniors just did not have a disturbed bacterial flora of the skin surface at the operated site, which did not pose any health threats or increase the risk of infection, and therefore no microbiological examination was performed. It is important to note that in each of the analyzed cases, the surgical field was properly disinfected; the dressing was applied in a correct and aseptic manner on the operating table, and observation and proper care were offered in the

recovery room and surgical ward, which also included educating the patient on postoperative wound treatment.

In some of the studied cases, there was a need to collect a skin swab during the visit to the surgical clinic. This usually applied to wounds from major surgical procedures, such as laparotomy. In intestinal obstruction, the incision of the skin continuity constitutes a so-called "clean contaminated wound", but in combination with the opening of the viscera (stomach, intestine, gallbladder), the incidence of infection increases. Wound superinfection is suspected when the patient shows fever, tachycardia and there has been an increase in peripheral blood leukocytes on the 3rd or 4th day after surgery [18]. Seniors over 65 years of age, who are statistically more burdened with severe comorbidities, often develop acute and rapidly progressive, potentially fatal, tissue infection [31]. Therefore, it seems that taking a skin swab before performing surgery should be the standard in preoperative care.

Conclusions

1. The number of conducted surgical operations increases with age.
2. The procedures most commonly carried out on senior patients are planned hernia surgeries and proctologic procedures.
3. The more severe the postoperative pain of the senior patient, the longer the duration of their stay in the recovery room.
4. In planned surgeries, the most common type of dressing applied is the occlusive kind, while during sudden emergencies, dressings involve swabs, gauzes or drains.

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