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Minimally invasive techniques for surgical treatment of sacrococcygeal pilonidal disease

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Sacrococcygeal pilonidal disease (SPD) is a common disease that affects mainly young men and leads to a decrease in their quality of life and a long-term loss of working capacity. According to the available statistical data, the disease prevalence in Europe and North America ranges from 26 to 40 cases per 100,000 people.

Objective — to determine the effectiveness of minimally invasive techniques for surgical treatment of chronic and recurrent forms of SPD.

Materials and methods. The study included 23 patients with SPD. It was clinical prospective, with a follow-up period of 18 months. The evaluation criteria were defined as recurrences, the frequency of postoperative complications, the severity of the pain syndrome, the patient's self-assessment of the cosmetic effect, the duration of hospitalisation, and the duration of surgery.

The results. The recurrence rate during the 18 months of observation was 39.1 %. The overall frequency of postoperative complications was 21.7 %. The median duration of surgery was 20 (CI 95 % 15—25) minutes, and the median duration of hospitalisation was 2 (CI 95 % 1—3) days. The median score of the pain syndrome according to the modified visual analogue scale was 5 (CI 95 % 4—5) points on the 0th postoperative day, 3 (CI 95 % 3—4) points on the third postoperative day, and 2 (CI 95 % 2—2) points on the fifth postoperative day. The cosmetic effect of surgical intervention was rated as rather dissatisfied (17.4 %), rather satisfied (52.2 %), and completely satisfied (30.4 %).

Conclusions. Minimally invasive techniques are effective for the surgical treatment of chronic and recurrent forms of sacrococcygeal pilonidal disease, reducing both the inpatient period and the surgery duration. Minimally invasive surgical treatment for chronic and recurrent forms of sacrococcygeal pilonidal disease has been observed to cause a moderate pain syndrome in the early postoperative period while contributing to satisfactory cosmetic results in the remote period. The surgical treatment of chronic and recurrent forms of sacrococcygeal pilonidal disease with minimally invasive techniques has been found to result in a relatively high recurrence rate (39.1 % over 18 months of follow-up).

Keywords
pilonidal disease, pilonidal cyst, sacrococcygeal area, minimally invasive techniques, recurrences.

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Sacrococcygeal pilonidal disease (SPD) is a common disease that mainly affects young men and leads to a decrease in the quality of life of such patients and a loss of work capacity for a long time [3, 12]. According to available statistical data, the prevalence of the disease in European and North American countries ranges from 26 to 40 cases per 100,000 people [8]. Most often, the onset of the disease occurs at the age of 16—30 years. However, the disease can also affect children and elderly patients. Males are approximately three to four times more likely to develop SPD than females. Apart from the sacrococcygeal area, other locations, such as the interdigital spaces of the upper limbs, the periumbilical area, and the front surface of the chest, rarely exhibit pilonidal disease (PD). Male sex, young age (16—35 years old), increased body mass index (BMI), belonging to specific ethnic groups, increased hair growth, anatomical features of the buttock area, and a low level of personal hygiene are factors that sharply increase the risk of SPD [11].

Today, a generally accepted point of view is that SPD is an acquired disease. The leading theory that confirms the acquired mechanism of etio-morphogenesis of SPD is the follicular-retention theory (FRT). According to theory, the primary underlying

factor in SPD is the proliferation of hair follicles in the sacrococcygeal area. This, together with the dysfunction of the sebaceous and sweat glands, triggers inflammation in the follicle area. The pump-like effect caused by the movement of the buttocks during walking and the shape of the gluteal cleft contribute to the migration of hairs from other locations of the body (primarily adjacent) to the bottom of the gluteal cleft. Next, these hairs and dirt particles fall into retention cavities formed at the site of local follicular inflammation. In the future, such a cavity will increase in size, and the migration of hairs will continue within the boundary of the formed cavity. The shape of the hair and the presence of microscopic, unidirectional notches help to fix the hair in the formed cavity. The next stage is the development of a reaction to a foreign body (hair) and the attachment of an infection, which further contributes to the formation of a cyst or abscess [13].

SPD is divided into three fundamentally distinct forms: pilonidal abscess (PA), symptomatic pilonidal cyst (SPC), and asymptomatic pilonidal cyst (APC). The principle of distribution of these forms is based on the differentiation of clinical diagnostic and treatment approaches for such patients.

Most often, SPD requires differential diagnosis with other diseases affecting the sacrococcygeal and perianal areas: hidradenitis suppurativa, perianal manifestations of Crohn's disease, furunculosis, pararectal fistulas and abscesses, presacral tumours, and specific infections [1, 6].

The proper management of SPD remains a subject of debate, despite the extensive body of research undertaken, the existence of clinical treatment guidelines, and the international guidelines provided by leading professional associations [8, 14].

Objective — to determine the effectiveness of minimally invasive techniques for surgical treatment of chronic and recurrent sacrococcygeal pilonidal disease.

Materials and methods

The study was conducted at the clinical base of the Department of Surgery with a course of emergency and vascular surgery at Bogomolets National Medical University during 2020—2024. The study was clinical prospective. The inclusion criteria were defined as:

- the age of the patient of any gender is ≥ 18 years;
- the presence of a chronic or recurrent form of SPD.

The exclusion criteria were defined as:

- the presence of concomitant endocrine pathology (diabetes mellitus 1 and 2 types, diseases of the adrenal glands or brain accompanied by hypercorticism);
- body mass index is > 35 kg/m^2;
- organ transplantation in the anamnesis;
- history of taking immunosuppressive drugs during the last calendar year;
- congenital or acquired immunodeficiency syndrome of any genesis;
- the presence of bedsores and other defects of the sacrococcygeal area associated with the patient's long-term supine position;
- traumatic injury in the anamnesis, which led to a marked change in the anatomical configuration of the sacrococcygeal area;
- patients with an acute form (abscess) of SPD.

The study's evaluation criteria were the recurrence rate, frequency of postoperative complications, severity of pain syndrome (visual analogue scale of pain), patient self-assessment of the cosmetic effect, inpatient period, and duration of surgical intervention.

The follow-up period was 18 months. The study included 23 patients: 18 (78.3 %) males and 5 (21.7 %) females. The average age of the patients was 27 ± 7.2 years. The average BMI was 26 ± 2.5 kg/m^2. 15 (65.2 %) patients were permanent smokers, and 8 (34.8 %) did not smoke. A total of 10 (43.5 %) patients had surgical interventions due to SPD (a recurrent form of the disease). Within the scope of the study, 3 (13 %) patients were treated with the pit-picking technique, 9 (39.1 %) patients with the Moshe Gips technique, and 11 (47.8 %) patients with the Bascom-1 technique.

Statistical data processing was performed in the statistical packages PRIZM (GraphPad Software, 8.3.0) and IBM SPSS Statistics 22. We performed descriptive statistics. Measures of central tendency are presented as the mean (M ± SD) or median (Me). The Kaplan-Meier method was used to determine the cumulative frequency of events.

Results

The obtained results indicate that the surgical treatment of chronic and recurrent forms of SPD with minimally invasive techniques resulted in nine recurrences (two in the first three months, two patients in the period from 3 to 6 months, three in the period from 6 to 12 months, and two in the period from 12 to 18 months). Thus, the cumulative frequency of recurrences during 18 months of observation was 39.1 % (Fig. 1).

At the same time, the cumulative frequency of SPD recurrence in the first three months was 9.5 % (2 patients), the first six months — 19.04 % (4 patients), the first year — 23.8 % (7 patients), and the first 18 months — 39.1 % (9 patients).

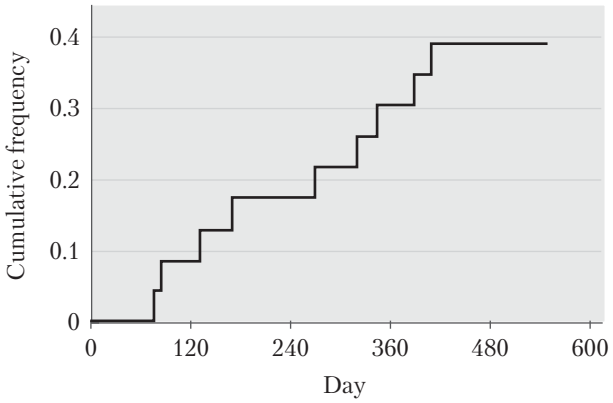

Figure 1. **Cumulative frequency of SPD recurrence during the follow-up period**

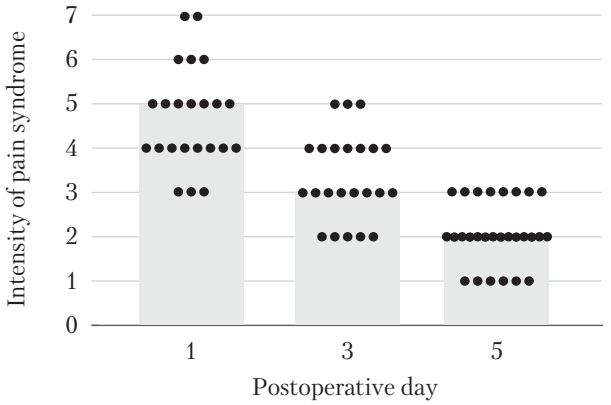

Figure 2. **Median intensity of pain syndrome**

The total frequency of postoperative complications was 21.7 % (n = 5), including seroma at 60 % (n = 3), hematoma at 20 % (n = 1), and surgical site infections at 20 % (n = 1).

The median duration of surgery was 20 (CI 95 % 15—25) minutes, and the median duration of the inpatient period was 2 (CI 95 % 1—3) days (1 day for 7 patients, 2 days for 9 patients, and 3 days for 7 patients).

The median score of the pain syndrome according to the modified visual analogue scale was 5 (CI 95 % 4—5) points on the 0th postoperative day, 3 (CI 95 % 3—4) points on the 3rd postoperative day, and 2 (CI 95 % 2—2) points on the 5th postoperative day (Fig. 2).

The patient self-assessment of the cosmetic effect was rated as completely dissatisfied (0 %), rather dissatisfied (17.4 %), rather satisfied (52.2 %) and completely satisfied (30.4 %) (Table).

Table. **Patient self-assessment of the cosmetic effect (n = 23)**

Patient self-assessment	Number of patients
Completely satisfied	7 (30.4 %)
Rather satisfied	12 (52.2 %)
Rather dissatisfied	4 (17.4 %)
Completely dissatisfied	0

Discussion

Surgical and non-surgical approaches are the current options for treating SPD. Non-surgical methods include local hair removal and the insertion of chemical agents into the cyst cavity. Surgical methods are classified into the following groups: a) excisional methods with primary (tensional) wound closure; b) excisional techniques without primary closure of the wound (or with its partial closure); c) minimally invasive methods without excision (various variations of the «pit-picking technique», curettage of the cyst cavity with or without the use of different surgical energies, endoscopic methods — EPSiT, laser methods); c) excisional techniques with non-tension (flap) wound closure (Bascom cleft-lift procedure, Karydakis flap procedure) [9, 10].

In the 1980s, Bascom included economic excision of the primary fistula sinuses in his modification of the minimally invasive surgical procedure for SPD management that Lord and Millar had first developed 20 years earlier. Today, there are different definitions for this modification: Bascom-I procedure or Bascom «pit-pick and drain». The author's original description of the technique involves excising the primary fistula sinuses using small diamond-shaped incisions. The cavity of the pilonidal cyst is drained through a large lateral incision, which is later left open for healing by secondary tension. Generally, a lateral incision is made at the site of the secondary fistula opening (if it is present). Additionally, curettage or subcutaneous excision of the secondary fistula is performed [7] (Figs. 3, 4).

According to the results of the Dole study, published in 2022, the recurrence rate within five years after the procedure was 62 % [4].

Koskinen's (2022) study concluded that patients who underwent Bascom-1 surgery experienced fewer postoperative complications (9.4 % vs. 36.2 %, p = 0.002) and had a shorter rehabilitation duration (median 14 days vs. 21 days, p < 0.001) compared to those who were treated using flap methods. A follow-up study of patients with a mean duration of 9.3 years (range, 5.4—10.6) revealed a statistically significant increase in recurrence rates after the Bascom procedure compared to the alternative technique (50.9 % vs. 10.3 %, HR 6, 65; p < 0.001) [9].

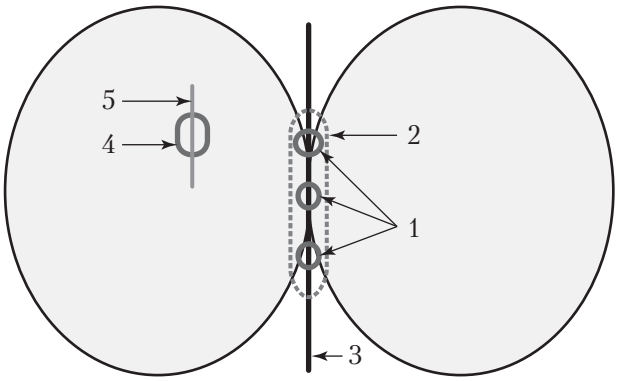

Figure 3. **Plan-scheme of Bascom-1 procedure: 1) primary fistula openings; 2) borders of the pilonidal cyst cavity; 3) the bottom of the gluteal cleft; 4) secondary fistula opening; 5) lateral incision line**

Figure 4. **The appearance of the operating field after the Bascom-1 procedure**

In 2008, Gips published a scientific report introducing the modification of the «pit-picking technique». Instead of a scalpel for the excision of primary fistula passages, he proposed using special circular skin trephines, which were used to excise the affected areas and curettage of the cyst cavity. A total of 1358 patients with SPD participated in the study, mostly men (84.3 %) with an average age of 20.9 ± 3.6 years. Postoperative infection, secondary bleeding, and early recurrence rates were 1.5 %, 0.2 %, and 4.4 %, respectively. Complete healing was observed within 3.4 ± 1.9 weeks in patients with complete postoperative follow-up. The recurrence rate after one year was 6.5 %; after five years, 13.2 %; and after ten years, 16.2 %. The average time to recurrence was 2.7 ± 2.6 years after surgery. The estimated disease-free probability was 93.5 % after one year and 86.5 % after five years [5].

A DiCastro study from 2016 revealed that all 2347 SPD patients underwent surgical intervention using the Gips method. 1714 men (73 %) and 633 women (27 %) participated in the study, and the average age of the patients was 19 years. After observation, the recurrence rate was 5.8 %. There were 102 cases of clinically significant postoperative complications (4.3 %) [2].

Conclusions

Minimally invasive techniques are effective for the surgical treatment of chronic and recurrent forms of sacrococcygeal pilonidal disease, reducing both the inpatient period and the surgery duration.

Minimally invasive surgical treatment for chronic and recurrent forms of sacrococcygeal pilonidal disease has been observed to cause a moderate pain syndrome in the early postoperative period while contributing to satisfactory cosmetic results in the remote period.

The surgical treatment of chronic and recurrent forms of sacrococcygeal pilonidal disease with minimally invasive methods has been found to result in a relatively high recurrence rate (39.1 % over 18 months of follow-up).

Declaration of interests

The authors declare that they have no conflicts of interest in this regard research, including financial, personal, authorship, or other nature, that could affect the research and its results presented in this article.

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Authors contributions

D. Y. Dubenko, R. V. Honza: research concept and design; D. Y. Dubenko: acquisition of data, analysis and interpretation of data, drafting the article.

Ethics approval and written informed consents statements

The Commission on Bioethical Expertise and Ethics of Scientific Research at the Bogomolets National Medical University concluded that the mentioned research does not contain an increased risk for the research subjects and was planned with existing bioethical norms and scientific standards regarding the conduct of clinical research involving patients (November 26, 2020, No. 139)

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Використання малоінвазивних методик для хірургічного лікування пілонідальної хвороби крижово-куприкової ділянки

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Пілонідальна хвороба крижово-куприкової ділянки є поширеним захворюванням, що вражає переважно чоловіків молодого віку та призводить до зниження якості життя пацієнтів і тривалої непрацездатності. Згідно зі статистичними даними, поширеність захворювання в країнах Європи та Північної Америки становить від 26 до 40 випадків на 100 тис. населення.

Мета —визначити ефективність застосування малоінвазивних методик для хірургічного лікування хронічної та рецидивної форми пілонідальної хвороби крижово-куприкової ділянки.

Матеріали та методи. Проведено клінічне проспективне дослідження з періодом спостереження 18 міс. У дослідження було залучено 23 пацієнти із пілонідальною хворобою крижово-куприкової ділянки. Критерії оцінки ефективності методик: частота рецидивів і післяопераційних ускладнень, тяжкість больового синдрому, самооцінка пацієнтами косметичного ефекту, тривалість госпіталізації та оперативного втручання.

Результати. Частота рецидивів за 18 міс спостереження становила 39,1 %, загальна частота післяопераційних ускладнень — 21,7 %. Медіана тривалості оперативного втручання — 20 хв (95 % довірчий інтервал (ДІ) 15—25 хв), медіана тривалості госпіталізації — 2 доби (95 % ДІ 1—3 доби). Медіана оцінки больового синдрому за модифікованою візуальною аналоговою шкалою — 5 балів (95 % ДІ 4—5 балів) у 0 післяопераційну добу, 3 бали (95 % ДІ 3—4 бали) — на 3-тю післяопераційну добу, 2 бали (95 % ДІ 2—2 бали) — на 5-ту. Косметичним ефектом оперативного втручання були скоріше незадоволені 17,4 % пацієнтів, скоріше задоволені — 52,2 %, повністю задоволені — 30,4 %.

Висновки. Використання малоінвазивних методик для хірургічного лікування хронічної та рецидивної форм пілонідальної хвороби крижово-куприкової ділянки є ефективним, сприяє зменшенню терміну перебування пацієнта в стаціонарі та тривалості оперативного втручання, зменшенню больового синдрому в ранній післяопераційний період і задовільним косметичним результатам у віддалений період хірургічного лікування, але спричиняє велику кількість рецидивів (39,1 % за 18 міс спостереження).

Ключові слова: пілонідальна хвороба, пілонідальна кіста, крижово-куприкова ділянка, малоінвазивні методики, рецидиви.

FOR CITATION

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