



EARLY INFECTION IN SURGERY OF IDIOPATHIC SCOLIOSIS

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Objective. To analyze the current level of early postoperative septic complications in a large retrospective series of patients with idiopathic scoliosis operated in the same clinic.

Material and Methods. The single-center retrospective database of 1973 patients who underwent surgical correction of idiopathic scoliosis with corrective segmental 3rd generation instrumentation during 1996–2013 was studied. In all patients, antibiotic prophylaxis was started 30 minutes before incision and lasted up to 72 hours after surgery. Cefazolin in age-specific dosage variances was used as antibiotic. Drainage of the area of surgical intervention was performed within two days after surgery.

Results. Surgical site infection occurred in 12 (0.6 %) cases within 90 days after surgery. Suppuration developed only in the area of posterior approach to the spine. The most common pathogen was *S. epidermidis* isolated in 68.0 % of cases. Implants and the achieved correction of spinal deformity were saved in 10 (83.0 %) patients.

Conclusion. Prevention of postoperative infections in surgery of idiopathic scoliosis is the most important task. It is necessary to carry out an early revision and debridement of the wound and strive to maintain implants if they are stable.

Key Words: idiopathic scoliosis, surgical site infection, correction of deformity.

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Surgical site infections (SSI) impose a tremendous stress on a patient, his family, and his therapist; moreover, they add to the costs the healthcare system bears [6].

Infectious complications in surgery for idiopathic scoliosis (IS) may necessitate the removal of endocorrector, thus nullifying the results of correction of spinal deformity. No Russian-language publications covering this problem are available. According to foreign sources, the frequency of occurrence of early postoperative SSI at IS correction varies from 0.7 to 6.9 % [5, 9, 10, 11]. Most publications either focus on the results of studies of small groups of patients or follow multicenter studies in which data from various clinics are analyzed. The Spine Surgery Department for Children and Adolescents of Novosibirsk Research Institute of Traumatology and Orthopedics has a vast experience in surgical treatment of patients with IS using modern segmental instrumentation.

The objective of this study is to analyze the current level of early postopera-

tive septic complications in a large retrospective series of patients with idiopathic scoliosis operated on in the same clinic.

Material and Methods

The single-center retrospective database of 1973 patients who had undergone surgical correction of idiopathic scoliosis with corrective segmental third-generation instrumentation during 1996–2013 was studied.

In all patients, antibiotic prophylaxis was started 30 minutes before incision and lasted up to 72 hours after surgery. Cefazolin in age-specific dosage variances was used as an antibiotic. Drainage of the surgical intervention area was performed within two days after surgery.

In accordance with the recommendations provided by the Centers for Control and Prevention of Pathogenic Diseases [1, 2, 4, 10], early SSIs were defined as infections that appear up to 90 days after the surgery. Information on treatment and

outcomes of all the previously confirmed SSI was analyzed.

Results

Segmental third generation instrumentation made of titanium alloy was used in all patients diagnosed with a postoperative infection.

In 12 (0.6 %) of 1973 analyzed cases of surgical treatment of idiopathic scoliosis, surgical site infection occurred within 90 days after surgery. Suppuration developed only in the area of the posterior approach to the spine. On average, the first signs of SSI appeared within 19 days after surgery (range: 7–38 days).

Based on the classification of early SSI [1, 10], 5 cases of superficial infection and 7 cases of deep infection were registered.

Results obtained for the 12 aforementioned patients are given in Table 1.

The most common pathogen was *S. epidermidis* (68.0 % of cases), followed by methicillin-susceptible *S. aure-*

us (MSSA), methicillin-resistant *S. aureus* (MRSA), *E. cloacae*, and *E. faecalis* isolated in 8 % of cases each (see Table 2).

Treatment of the site infections included drainage and surgical debridement of the wound with injection of antibiotics (6 patients); repeated surgical debridement of the wound with antiseptics, drainage of the wound with injection of antibiotics and removal of the endocorrector (2 patients); injection of antibiotics and redressment (4 patients). The average duration of follow-up for 12 patients with SSI comprised 30 months (16–61 months).

Cases of female patients who had undergone removal of endocorrector had distinctive features.

1. A 14-year-old girl; SSI occurred on the tenth day after the surgery. The pathogenic agent was MRSA isolated from the pharynx in both parents; it matched the MRSA strain isolated from the patient's pharynx and surgical site.

2. A 26-year-old woman; early deep postoperative infection occurred on day 22 after the surgery. This patient suffered from acne predominantly localized over the face and spine. The conservative treatment of this condition for several years yielded no effect. The pathogen isolated from the postoperative wound and acne eruptions was identified as MSSA.

In addition to the 12 confirmed cases of early SSI, there have been registered 2 more cases (0.1 %) that did not comply with the criteria provided by the Centers for Control and Prevention of Pathogenic Diseases caused by SSI (these were the cases of the postoperative wound dehiscence).

Discussion

Prevention of postoperative infections in surgery for idiopathic scoliosis is the most important task.

Most Russian and foreign authors specify the necessity of antibiotic prophylaxis only during 24 hours – starting 30 minutes before the incision and further in the intraoperative period depending on its duration [4, 11]. Despite the scrupulous compliance with all aseptic principles and the fact that elective sur-

gery for idiopathic scoliosis is classified as clean surgery, we used the antibiotic regimen recommended by V.P. Sukhorukov [3] for three days including the surgical day. At the present moment, It has proven to be effective, although there is a possibility that further studies will provide a rationale for reverting to shorter schemes applied in orthopedics.

The necessity of drainage of the postoperative wound is currently a debatable question. In many clinics, it is common practice not to drain the surgical site. A proper fusion procedure requires exposing a large bone surface, which, in its turn, conditions certain volume of postoperative blood loss. Based on our experience, we consider it necessary to drain postoperative wound during 48 hours. Ho et al. [7] showed that neglecting postoperative drainage is a risk factor

for late infection in surgery for idiopathic scoliosis.

According to foreign authors [11], higher occurrence of SSI was reported for stainless steel endocorrectors compared to titanium ones. In patients diagnosed with early septic complications in our clinic, titanium alloy instrumentation was used.

Katyal et al. [8] demonstrated the frequency of occurrence of infectious complications in the surgical site to be 11 % in the group of patients with obesity; 12 %, in overweight patients, and 3 %, in normal-weight patients. In our findings, body mass index in patients with infectious complications varied from 13.0 to 20.4 (mean, 17.8 ± 2.0); 6 patients (50 %) were of normal weight, 6 (50 %) had weight deficit.

Table 1

Description of patients diagnosed with SSI

Parameter	Value
Preoperative bed days	6 ± 2
Male/female ratio	1/11
Age, years	17 ± 4
Weight, kg	$45,5 \pm 10,0$
Height, cm	157 ± 12
BMI	$17,8 \pm 2,0$
Cobb angle of the initial deformity	66 ± 33
Surgery duration, min	173 ± 58
The level of fusion, n	12 ± 1
With mobilizing discectomy/ without mobilizing discectomy, n	5/7
Estimated bloodloss, % of total blood volume	23 ± 11

Table 2

Pathogens isolated from the wound

Pathogens	Cases, n (%)
Gram-positive pathogens	11 (92)
<i>S. epidermidis</i>	1 (8)
MSSA	8 (68)
MRSA	1 (8)
<i>Enterococcus faecalis</i>	1 (8)
Gram-negative pathogens:	1 (8)
<i>E. cloacae</i>	1 (8)

MRSA – methicillin-resistant *S. aureus*;

MSSA – methicillin-susceptible *S. aureus*.

Conclusion

The frequency of SSI occurrence after surgery for idiopathic scoliosis equaled 0.6 % in our study. This is a remarkable low value as one of the latest foreign publications reports the frequency of SSI occurrence as low as 0.7 % [11]. It is important to mention that the authors considered only deep wound infections,

whereas our study listed both superficial and deep types of infections.

We managed to save the implant and therefore, maintain the result of spinal deformity correction in 10 (83 %) of 12 our patient. This fact proves the validity of the approach that has currently become conventional and involves early revision and debridement of the wound with striving to maintain implants if they

are stable. To our belief, the presented data indicate the necessity of forwarding patients and performing operative treatment of IS in highly specialized clinics that have a vast experience of managing such cases, including those with complications. We find it necessary to continue analyzing our clinical material.

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