Ochrona brzegów rany przed zakażeniem przy użyciu retraktora ran operacyjnych Alexis

(Protecting wound edges from infection using an Alexis wound retractor)

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Streszczenie -Wstęp. Zakażenia ran operacyjnych towarzyszą ludzkości od zarania dziejów. Przez wieki były jedną z głównych przyczyn zgonów. Pomimo rozwoju wielu dziedzin życia, postęp w ich leczeniu nastąpił faktycznie w ciągu ostatnich stu siedemdziesięciu lat. Niemniej jednak problem zakażeń ran operacyjnych jest nadal aktualny pomimo szerokiego zastosowania działań profilaktycznych. Uważa się, że ilość tego rodzaju zakażeń jest jednym z najistotniejszych wyznaczników rozwoju medycyny. Autorzy założyli, że zastosowanie jednorazowego retraktora ran Alexis zmniejszy ilość zakażeń ran operacyjnych, w szczególności u chorych wysokiego ryzyka.
Materiał i metoda. W celu rozwiązania problemu badawczego zastosowano metodę badań reprezentacyjnych, a jako narzędzie badawcze posłużył arkusz analizy dokumentów. Autorzy przyjęli, że badanie będzie wiarygodne, gdy ryzyko zakażenia rany operacyjnej będzie odpowiednio duże. Chorzy, spełniający założone kryteria, zostali zakwalifikowani do dwóch losowo z kompletowanych grup. Obie grupy liczyły po 15 osób, przy czym wiek grupy badanej wahał się pomiędzy 54-83 lat, zaś grupy kontrolnej 57-86 lat. W grupie badanej stosowano retraktor, w grupie kontrolnej nie. Rana operacyjna była oceniana w trakcie hospitalizacji pacjenta codziennie, a po wypisaniu z oddziału okresowo do 30-ego dnia po operacji. W przypadku pojawienia się infekcji w ranie, została ona potwierdzona badaniem mikrobiologicznym.
Wyniki i wnioski. W oparciu o analizę wyników badań można stwierdzić, że u chorych z grupy podwyższonego ryzyka zastosowanie retraktora ran operacyjnych Alexis zmniejsza prawdopodobieństwo zakażenia rany operacyjnej, a skuteczna mechaniczna protekcja rany operacyjnej powinna stać się stałym elementem działań profilaktycznych zmierzających do ograniczenia ilości zakażeń ran operacyjny.
Słowa kluczowe - retraktor, rana operacyjna, zakażenie.

Abstract – Introduction.The infections of surgical wounds have been very much around since the beginnings of mankind. For ages they have been one of the predominant causes of death. Despite the fact that many aspects of life have undergone rapid developments, the progress in surgical wound treatment emerged during the last 170 years. Nevertheless, the problem of surgical wound infection is still a threat even despite many preventive actions. It is widely acknowledged that the number of those infections is one of the most crucial indicator of the development of medicine. The author has assumed that the use of a disposable Alexis wound retractor is going to decrease the number of surgical infections, especially among high-risk patients.
The material and the method. In order to solve the research problem, the sampling procedure method was used. The research instrument was document analysis worksheet. The authors assumed that the research would be more credible if the risk of surgical wound infection is high enough. The patients who met the criteria were divided randomly into two groups. Both groups had 15 people; their ages varied from 54 to 83 in the sample group and from 57 to 86 in the control group. The retractor was used in the sample group and not in the control group. The surgical wounds were assessed each day while the patient stayed at the hospital, and after that periodically until 30 days after the operation. If the wound started showing indications of an infection, a microbiological test was run to confirm it.
The results and conclusions. Judging by the analysis of the research results, one can conclude that the use of an Alexis surgical wound retractor on high-risk patients decreases the probability of a wound infection and the effective mechanical protection of surgical wounds should become a constant element of preventive actions aimed at limiting the number of surgical wound infections.
Key words - retractor, surgical wound, infection.

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I. INTRODUCTION

Despite the undoubted progress of medical science, the problem of surgical wound infections is still very much around. It is crucial in therapeutic process, both in individual and epidemiological as well as economic terms. A wound infection can merely be an incident which hardly affects the post-surgical progress. However, it might as well be just a prelude to a whole sequence of events which may finally cause serious complications or even the patient's death.

The increased frequency of wound infections poses a viable threat for the life and health of patients of a given healthcare institution. Moreover, it disorganizes the work in that institution and sometimes even makes it necessary to suspend its service. What is more, it brings about economic consequences that could affect the institution financially [1]. Therefore, effective prevention from infectious complications, surgical wound infections in particular, requires coordinated actions on different levels of healthcare, beginning with strategic planning and ending with specific practical forms of infection prevention. Ever since the early days of mankind people have been exposed to accidents and wounds resulting from them. Yet, wounds have also been created in a controlled way, with an intention of curing an illness. Both of these were subject to infections. Over the ages, many ways of fighting against infection have been undertaken, most of them being empirical in nature. It was as late as in 19th century that foundations for a new, modern approach to the matter of surgical wound infections were laid, mainly thanks to the discoveries of Pasteur i Semmelweis. The discovery of penicillin by Fleming was another quantum leap in treating infections. It provided medicine with a new weapon, whose significance was unmatched [2]. Presently, healthcare staff have essential knowledge and tools necessary to fight infection effectively; nevertheless, the battle is sometimes lost. Taking that into account, the significance of preventive actions as the cheapest and most effective way to improve the health of a given population should be stressed all the more. One of the preventive methods of surgical wound infection is protecting the wound mechanically.

The purpose of this paper is to evaluate the application of disposable ALEXIS wound retractor for the prevention of wound infection (fig.1,2).

Fig. 1 Alexis Wound Retractor – a modern way of surgical wound mechanical protection [3]

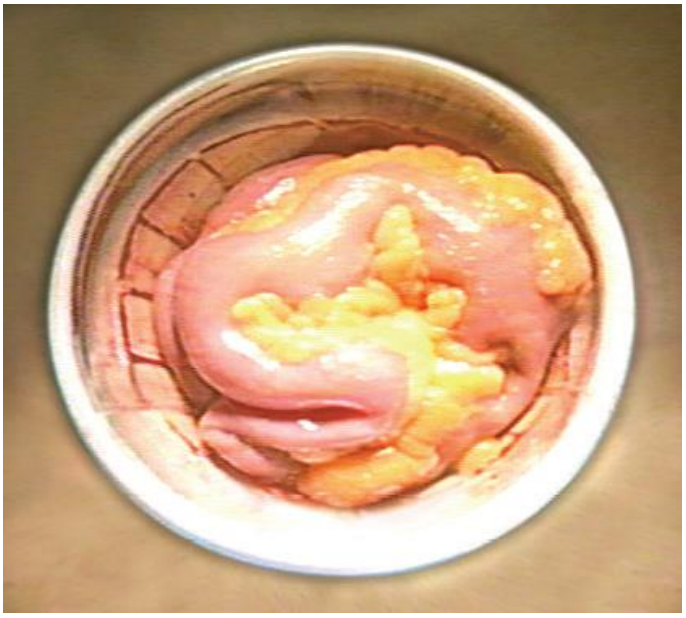

Fig. 2 A sample application of Alexis surgical wound retractor [4]

II. MATERIALS AND METHODS

In order to solve the research problems, a survey sampling method was applied. The research tool was a document analysis sheet. The sheet was composed of four parts, each of them containing alternative questions. The first part consisted of questions about patients' sex, their hospitalization and the difficult conditions they were dealing with. The second pertained to the nature of the operation. The third part was related to preventive actions undertaken. The questions in the fourth part pertained to the use of the studied subject.

The authors assumed that the research would be credible if:

1. the risk of surgical wound infection is high enough.
2. two groups are compared according to the method assumed and using medical documentation analysis sheet, the two groups being treatment group in which Alexis wound retractor was used and control group.

Both these groups were to meet at least two of the following criteria:

- Age of 65 or more,
- Expected surgical wound contamination class III (contaminated) or IV (dirty-infected), surgical wounds in the abdominal area with access to peritoneal cavity,
- Compromised immunity syndromes (e.g. blood disorders, immunosuppression, chronic steroid treatment, chemotherapy),
- Patients rated at least 3 in the ASA (American Society of Anaesthesiologists) physical status classification system.

The 3rd category is a patient with severe systemic disease which limits the patient's viability, e.g. heart attack suffered within 3 months prior to the surgery, unstable angina pectoris, serious diseases of respiratory system, unregulated diabetes),

- malnutrition,
- a co-existent infection unrelated to the operating field,
- cancer.

Considering the limited time of the research and its unicentrality, the authors established that the analysed subject would be the use of Alexis wound retractors in the treatment and control group, each of them consisting of 15 patients

The study took place between May 1, 2011 and November 30, 2011 at the General, Oncologic and Gastroenterological Surgery Ward Department of the Regional Traumatology Hospital in Warsaw. The documentation analysis sheets were filled in by doctors employed by the Department in the time of their choice. The interviewer was not present when the questionnaires were being filled in. The Head of the Department, who was also a Medical Director consented for the research.

III. RESULTS

Between May and November 2011 the authors conducted a meta-analysis of the effects the use of Alexis wound retractor had based on medical documentation analysis sheets.

The treatment group

The treatment group consisted of 9 women and 6 men aged between 54 and 83 (the mean age being 71.2 lat). 11 patients were hospitalized and then operated on as planned, while four people had emergency surgeries as they were admitted as emergency cases. The reason for hospitalization in each of the cases was cancer. Three out of 15 were treated for diabetes and five were obese. In one case shock could be observed before the surgery.

In the cases of 13 patients, the surgery lasted for between two and four hours. In the remaining two cases surgeries took more than 4 hours. In 11 cases operating field was deemed contaminated and in four – dirty.

In 11 cases, antibiotic prophylaxis was used. Pre-surgery antibiotic treatment was applied in four cases. All patients who were operated as planned (11) took a shower within two hours before surgery. In the cases of two patients there was a need to shave the operating field within 30 minutes before surgery.

In two cases the surgical wounds were infected before Alexis wound retractor was applied. In none of the cases was the retractor replaced or removed before the wound was stitched . In one case the surgical wound was infected despite the fact the retractor was applied. It was culture-confirmed. The patient in question was 73, he was admitted and operated on as an emergency; moreover, he was obese and diabetic. The duration of the operation was between two and four hours. Operating field was deemed dirty before the retractor was implemented. Oligovolemic shock occurred during the perioperative course.

The control group

The control group consisted of 10 women and five men aged between 57 and 86, the mean age being 69,8. Ten patients were hospitalized as planned and the remaining five were emergencies. In 12 cases the duration of hospitalization did not exceed 48 hours; the remaining 3 patients were hospitalized for a period longer than that. All 15 patients were hospitalized because of cancer. 2 patients were subject to chemotherapy, another 2 were chronically treated for their diabetes. Three of the patients showed symptoms of a shock in the perioperative course. Five patients were obese.

Three out of 15 cases were emergency surgeries. In 12 cases, the surgery duration was between two and four hours. The remaining 3 operations took more than 4 hours. In 12 cases the operating field was deemed contaminated and in three- dirty.

In 12 cases antibiotic prophylaxis was applied. Pre-surgery antibiotic treatment was used in three cases. 12 of the patients took a bath within the two hours before the operation. In the cases of 4 patients, the operating field was shaved within 30 minutes before the operation. In 12 cases the operative field was preliminarily disinfected.

In four cases the surgical wound got infected. The first case of that was a 59-year-old patient. She was hospitalized and operated on as planned. She was obese and diabetic. The duration of pre-surgery hospitalization exceeded 48 hours and the duration of the surgery itself was more than four hours. The patient was on antibiotic therapy. The operating field was deemed contaminated. The surgical wound infection was confirmed clinically and microbiologically. Another case was a surgical wound infection of a 67-year old patient admitted in emergency. Her hospitalization duration did not exceed 48 hours. She was subject to chemotherapy before the operation. Shock was recorded in the perioperative course. The surgery itself lasted less than 4 hours. The operating field was deemed dirty. The patient received pre-surgery antibiotic treatment. The third case of surgical wound infection was a 64-year-old male. He was hospitalized as planned. Before his surgery he was hospitalized for the period exceeding 48 hours. The patient was obese and diabetic. The surgery lasted over four hours. The operating field was deemed contaminated. Antibiotic prophylaxis was applied. He took a shower within the two hours be-

fore his surgery and within 30 minutes before the operation, the operating field was shaved. The fourth patient was 68, hospitalized and operated on as an emergency. The surgery duration was between two and four hours. The operating field was deemed dirty. The symptoms of a shock were recorded in the postoperative period. The patient was subject to preoperative antibiotic treatment.

IV. DISCUSSION

In the literature devoted to the matters of surgical wound infection a lot of attention is paid to the significance of preventive actions in limiting the number of infections as well as to the general condition of the patients and their reserve as crucial determinants of infections [5-12]. These complications are of even greater significance as the cost of treatment is often substantially increased because of them [13]. The undertaken research indicates that:

1. all the patients in both groups met the pre-established criteria of increased surgical wound infection risk,
2. in the treatment group the number of surgical wound infections was significantly lower than in the control group (7 % and 27%),
3. the most significant factor facilitating surgical wound infections is a shock in the perioperative course (a total of three cases of it was recorded: one out of one in the treatment group and two out of three in the control group),
4. among the remaining risk factors, diabetes deserves special attention (all the diabetic patients in the control group and one out of three in the treatment group were infected),
5. the remaining risk factors appear to be of lesser importance,
6. the more risk factors occur, the greater the probability of surgical wound infection,
7. among the preventive actions decreasing the risk of surgical wound infection, mechanical wound protection is of the greatest significance.

These statements are principally similar to the observations of other authors [8,9,14]. The risk factors of special importance appear to be pathologies impairing blood flow through callus (shock, diabetes) [15].

Surgical wound infections occur most of the time as a result of more than one negative factor [19]. In order for them to be productive, preventive actions must be adequate to the potential risk of pathology they are aimed at preventing from. Therefore, Alexis wound retractor should be applied as an infection preventive method only when its effectiveness is viable. In the light of the research conducted, the authors are of the opinion that this measure should not be utilized in the case of operations in which the wound is deemed clean and the general condition of the patient does not affect his or her immunity. In other situations, the use of the retractor is more than justified. The question whether there is any point using the retractor on a wound that is originally dirty remains unanswered. However, the authors' are inclined to encourage its use if the wound can be cleaned mechanically and chemically during the surgery and what is more, it is still exposed to possible infections for the remainder of the operation. It has to be stressed that the retractor itself is used mainly to tract the edges of surgical wounds; and prevention from infections is its secondary application.

Because of the unicentrality of the research as well as its limitations in terms of number of patients, the results obtained should not inspire too far-fetched general conclusions. Nevertheless, as compared to the data reported in literature referred to, which in most of the cases confirm our observations, they may constitute a starting point for further research.

V. CONCLUSIONS

1. In the group of increased infection risk patients, the use of Alexis wound retractor proved to decrease the probability of surgical wound infection.
2. The use of effective mechanical protection of surgical wounds contributes to the reduction medical and economic expenses related to the treatment of infections.
3. Effective mechanical protection of surgical wounds should become a permanent element of preventive actions aimed at limiting the number of surgical wound infections.

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