

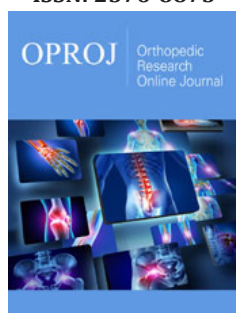
Osteomyelitis - Therapy through “Constant Drainage” According to Willinegger

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Abstract

The therapy of infections in bones and joints has always been a big and complicated problem. Below, we present the material of the lecture from 2005 given during the 50th Anniversary of Orthopedic University Department in Lublin and 25th Anniversary of the Pediatric Orthopedic and Rehabilitation Department. The material has never been widely published. In article we evoke the Willinegger method-in our opinion-the best method in treatment of infected bones or joints

Keywords: Osteomyelitis; Therapy; Constant drainage

Introduction to the Problem

A. The observation presented in the article dates from 1995-2005. At the time - 1995-2009 - Prof. Tomasz Karski was the Head of Pediatric Orthopedic and Rehabilitation Department in Medical University in Lublin, Poland. During this period, there were few, but difficult to treat, cases of patients with osteomyelitis of bone or joints in the Department. We knew three methods of therapy of such patients at that time: Resection of the bone in the inflammation region and next healing “as an open wound”-it was recommendation of Prof. St. Piatkowski and Prof. E. Warda, members of Lublin University Orthopedic Department [1,2].

B. Resection of bone in the inflammation region and next healing by filling with spongy bones-recommendation of Prof. Horst Cotta from Orthopedic University Department in Heidelberg, Germany [3].

C. Opening the inflammation region in bone and the permanent drainage according to Willinegger-in German-Spüldrainage-method recommended by Prof. Horst Cotta and Prof. Rochus Plau from Heidelberg. This method of therapy was introduced in Lublin Department in 1974 after T. Karski’s scholarship stay of DAAD in 1972-1973 Orthopedic University Department in Heidelberg (Germany) where this method was commonly used. In the therapy of all the Lublin patients in 1974-2005 we used the “Willinegger method” and we obtained very good results-full healing of infected bones or joints [3-5].

D. They are also other methods of treatment of infected bones, especially in cases connected with big inflammation changes after implantation of prosthesis and with big changes in surrounded soft tissues [5-9].

Material from the Years 1974-2005

In the activity of Pediatric Orthopedic and Rehabilitation Department of Medical University of Lublin/Poland (1970-2009) we treated patients with deformities/results after osteomyelitis and/or chronic arthritis or chronic osteomyelitis. The patients have been mostly treated before in other Departments for 1 to 5 years or even longer but without success. Because of the lack of good results, they came to the Lublin Department. Treated children were mostly cases of posttraumatic osteomyelitis, hematogenic inflammations (23 cases) and complications after surgery (4 cases). In the material, there were also acute cases or exacerbation of the chronic ones. Material-there were 27 young patients-17 boys and 10 girls as well as 2 adult patients-a 23 year old man and a 32 year old woman. The upper extremity was affected in 4 cases and the lower extremity was effected in 23 cases. The age of young patients var-

ied from 8 months to 15 years-with the average of 9 years and two older cases, 23 and 32 years old. In some patients open or closed fistulas occurred. Some cases without fistulas had hematogenic background of osteomyelitis and they were children mostly. The infection was located in femur, tibia, bone of foot, knee joint, hip joint, elbow area and humerus bone. Two ours adults patients have been operated by T. Karski in Orthopedic Departments cooperating with us-in Janów Lubelski and in Zamość.

General information about drainage

The conditions for an effective drainage are thorough “cleaning” of the infected place in the bone, and constant, gravitational flow of physiological solution through two drainage tubes placed in the cleaned area. One inflow and one outflow drainage tube. The most important condition is a fast flow, 60 drops per minute at least. If the flow is too slow the drainage can be clogged. We believe that this method should be used not only in the Orthopedic Departments, but also in the General Surgical Departments. Thanks to this method in

the orthopedics we can save patients’ health but in general surgery-their lives-for example in abdominal infections (peritonitis).

Aim of the treatment

There are various methods of conservative and operative treatment of osteomyelitis known. The most important rule is the evacuation of the inflammatory fluid (*pusevacuatio*) from the source of inflammation. The methods applied in other Departments were biopsy with evacuation of the fluid, temporary outflow drainage, repeated irrigation with physiological solution, closed wound healing with cleaning of the focus of osteomyelitis and filing with spongy grafts [3], open wound healing [7,8]. Prof. Hans Willinegger from Switzerland introduced the so-called “constant drainage” as a way of treatment of osteomyelitis. His method was widely applied in University Orthopedic Department in Heidelberg/Germany and was transferred to our Department in the years 1974-75 by T. Karski after his educative stay of DAAD in University Orthopedic Department in Heidelberg [4,5] as mentioned above.

Willinegger drainage-details of technique (Figure 1)

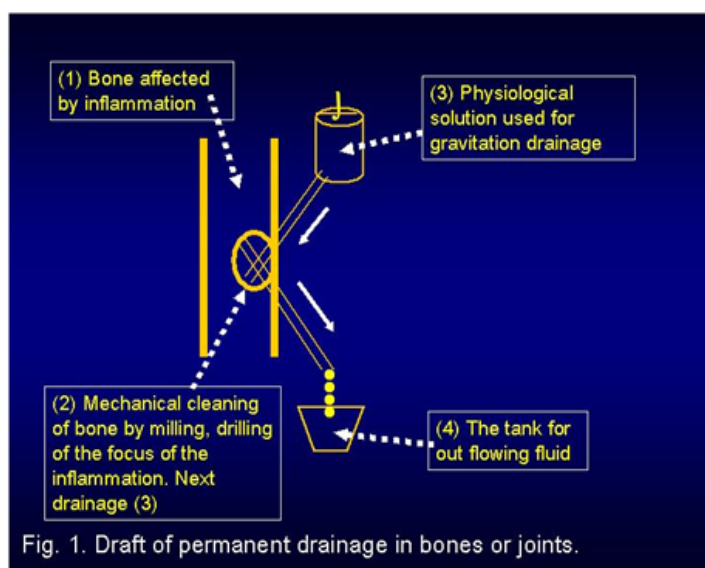


Figure 1: Draft of permanent drainage in bones or joints.

- Bone affected by inflammation.
- Mechanical cleaning of bone by milling, drilling of the focus of the inflammation, next drainage.
- Physiological solution used for gravitation drainage.
- The tank for out flowing fluid.

The patient is operated under general anesthesia. Exposure of focus of osteomyelitis-mostly by bone fenestration. Mechanical cleaning of bone by milling, drilling of the focus of the inflammation or joint cleaning with physiological natrium salt and hyper-oxygenic water very thoroughly and for a long time-approx. 30-45 minutes. Removal of *sequester*. Placing of two ends of drains in the remaining free space after extraction of sequester in focus of osteomyelitis. The drains should be crossed inside the bone. Both drains are brought

out through healthy soft tissue and healthy skin with a distance of 5-8 centimeters or more between them. The drainage through constant “washing” is begun immediately after the operative procedure, in the operation theater. Physiological solution or Ringer solution should be used for drainage. It is important not to add any antibiotics or other medicine to the drainage since only physiological solutions can stimulate the process of bone healing (Heidelberg Orthopedic Department opinion). The flow of

drainage should be of 60 drops or more per 1 minute, never fewer! The quantity of inflowing and out flowing solution should be in balance. The color of out flowing fluid is noted. In the beginning it is red tinted and sometimes opaque, later, at the end of the therapy it should be completely clear. In addition the microscopic investigation of the out flowing fluid is made as well as the test for blood sedimentation (in Polish-OB). In four patients heparin was added to the drainage because of disturbances of the flow. All patients were given antibiotics intravenously, simultaneously with the drainage treatment. The average time of drainage was 2 weeks ranging from 1 to 5 weeks.

Results

In all patients treated with Willinegger drainage we noted good results: we observed full healing of inflammation, no fistula remaining, wound closure *per primum intentionem*. Twenty one patients were reported to have recovered fully. Remaining six patients, although the osteomyelitis was cured, reported minor extremity insufficiency and occasional pain. These symptoms occurred after overstressing the extremity, for example after a long walk or a jogging.

Discussion

Patients with bone or joint infections were not typical for Orthopedic Wards in Lublin but occasionally we treated such cases. The infections occurs as a complication after open bone fractures, after surgery or as hematogenous infections. Treatment of chronic osteomyelitis and arthritis remains a difficult subject in orthopedic surgery. In our practice and literature three possible treatments are suggested:

- A. "Open wound treatment",
- B. Cleaning and using of spongy grafts,
- C. Willinegger drainage.

The first method was suggested as "experience" of old orthopedic surgeons in Poland [7,8]. The second method was used (observations of T. Karski in years 1972-1973) in Heidelberg Department in Germany [3,5]. The last method of constant drainage was used frequently in Heidelberg as well as in Pediatric Orthopedic

and Rehabilitation Department in Lublin/Poland [4,5] as the best method.

Conclusion

1. The Willinegger drainage is a simple but highly effective method of treatment of osteomyelitis of bones and infections of joints in children and adults.
2. In all patients we have received very good and good long-term results of the therapy.
3. The "constant drainage" does not require costly procedures and should be considered in every patient with acute or exacerbated osteomyelitis regardless the age.

Acknowledgment

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