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POSTOPERATIVE ORTHOPAEDIC INFECTIONS IN PATIENTS WITH DIABETES MELLITUS

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In diabetes mellitus it is generally accepted that the resistance to infections is decreased. Thorough search of the literature failed to reveal any investigations of the frequency of postoperative locomotor system (orthopaedic) infections in diabetes in clean surgery. The purpose of this investigation was to ascertain whether the incidence of postoperative orthopaedic infections is higher in diabetics than in non-diabetics. This paper is one of a series based on an analysis of a 5-year material of orthopaedic infections encountered in a quarter million population.

MATERIAL AND METHODS

During a 5-year period 1963 through 1967 all patients with orthopaedic infections at the Department of Orthopaedic Surgery, Malmö General Hospital, were subjected to analysis. This 1,500 bed hospital is the only somatic disease hospital for the population of the city of Malmö (241,778 inhabitants in December 31, 1963, and 254,338 inhabitants in December 31, 1967) and is therefore suitable for an epidemiological study (Lidgren & Lindberg 1972). The Department of Orthopaedic Surgery has 150 beds and is responsible for both classic orthopaedics and fracture surgery.

From the beginning of 1965 data on all patients at Malmö General Hospital were stored in a computer, so that it was possible to compare diabetics and non-diabetics regarding parameters such as sex, age, diagnosis, type of operations and number of days in hospital. From 1965 through 1967 a total of 3,617 clean orthopaedic operations were performed. Of these patients 203 had diabetes mellitus.

The frequency of postoperative orthopaedic infections after clean operations in diabetics was compared with non-diabetics. The material is described in terms of age, sex, the anatomic localisation of the infection, bacteriology and whether the infection affected the results of the operation.

Only patients using parenteral insulin or oral tablets were included in the diabetic material.

Material from infections was routinely obtained by swab for culture. Besides ordinary tests such as E.S.R. and temperature, determinations were also made of the antistaphylolysin titer (ASTA) and C-reactive protein (CRP). All patients were examined roentgenologically.

RESULTS

Of 203 clean operations performed in diabetics, 7 (3.4 %) were infected postoperatively. During the same time 3,414 clean operations were performed in non-diabetics. Of these 124 (3.6 %) were infected. Comparison between the frequency of postoperative infection in diabetics and in non-diabetics analysed with chi-square analysis showed $X^2=0.1$ ($p > 0.05$) and thus no demonstrable difference between the groups. There was no difference between the distribution of age and sex. Operations with long durations were not less frequent in diabetics compared with non-diabetics. However, only 2 arthroplasties with endoprosthesis were performed in diabetics compared with 70 in non-diabetics.

The mean age of the infected diabetics was 61 years. The ages of the patients in this group ranged from 40 to 82 years. There were 3 females and 4 males. The anatomic localisation of the infection was the hip in 5 cases, the lower leg in one and the foot in one.

Staphylococcus aureus was the pathogenic organism in 3 of 7 patients, in one patient culture gave growth of *Escherichia coli*, in one patient enterococcus, and in one patient *Staphylococcus albus*. In 2 patients with negative culture the clinical picture together with high-grade fever, high E.S.R., and positive serology gave the diagnosis of infection.

None of the orthopaedic infections were fatal, but in two cases permanent disability could not be prevented despite antibiotic therapy. In one patient with trochanteric fracture of the femur the nail-plate was removed before healing had occurred, and in one patient with fracture of the tibia a chronic fistulating osteitis developed.

DISCUSSION

It is postulated that postoperative infections are prone to occur in diabetics (Dineen 1961, Forsham 1960). Schneiersen (1962) reported an increased frequency of infections in patients with uncontrolled diabetes with ketosis but not among patients with well-controlled diabetes. Animal experiments have indicated that healing is slower in uncontrolled diabetes (Rosen & Engquist 1960). In a study reported in *Annals*

of *Surgery* (1964) the incidence of surgical wound infection in 356 diabetic patients was 10.4 per cent, i.e. significantly higher than the overall infection rate of 7.4 per cent, but when the frequency was corrected for age it was the same as in non-diabetics. According to the literature, diabetes mellitus also predisposes to bacterial arthritis, but no supportive figures are given (Kelly et al. 1965, Viek & Santelangelo 1962).

In the present material where the patients' diabetes regulation was performed in intimate cooperation with internists and anaesthesiologists no difference was found in the frequency of postoperative orthopaedic infections between diabetics and non-diabetics.

SUMMARY

The frequency of postoperative infections following clean orthopaedic operations in non-diabetics, 3,414 patients with 124 infections, did not differ from that in diabetics, 203 patients with 7 infections.

The patients are described in respect of age, sex, localisation of the infection and bacteriology. The infections were never fatal, but in 2 cases they spoiled the results of operation.

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