

Morbidity after femoral neck fracture not increased in diabetics

In a retrospective study the morbidity following surgery for femoral neck fracture was investigated in 81 patients with diabetes mellitus and in 81 non-diabetic matched control patients. Sixteen patients in each group had postoperative complications with no tendency to specific complications in the diabetic patients. Morbidity was equally distributed between patients treated with insulin, antidiabetic agents, and diet. Our results do not support the common belief that there is an increased postoperative risk in diabetic patients.

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Diabetes mellitus is usually considered to be a risk factor in surgical procedures (Cruse & Ford 1973, Kahn et al. 1974). This conclusion has been based on retrospective series, in which matched non-diabetic control patients were not included. Diabetic patients have a higher postoperative morbidity since the diabetic disease may lead to concomitant impairment in function of various organs, thereby increasing risk. However, such retrospective studies cannot elucidate whether diabetes mellitus *per se*, corrected for possible organic disease, increases postoperative risk. Recent studies including matched controls indicate that diabetes does not increase morbidity following selective surgical procedures such as major vascular surgery (Hjortrup et al. 1983) or gall bladder surgery (Walsh et al. 1982).

We have studied the morbidity in diabetic patients undergoing acute operation for femoral neck fracture and in matched non-diabetic patients.

each year, the selection of control patients was performed at random to match diabetic patients. Firstly, non-diabetic patients undergoing the same operative procedure as the diabetics were extracted. Then, matching with regard to sex, age and weight was performed, allowing a 10 per cent deviation in age and weight between diabetic and non-diabetic patients. Finally, the control patients were selected with regard to the existence of complicating cardiovascular disease. During the selection procedure, only preoperative data were considered, without knowledge of the postoperative course. Twenty-nine patients in each group received treatment for cardiovascular disease with digoxin, diuretics or beta-blockers, either one of the drugs or a combination. Thirteen diabetics and 15 non-diabetics received digoxin. Diuretics were used in 22 diabetic and 18 non-diabetic, and beta-blockers in seven diabetic and 13 non-diabetic patients. With regard to preoperative status of mobilization, two diabetics were bedridden, five were in a wheel-chair and 74 were mobile and independent, compared with zero, five and 76 patients,

Patients and methods

We reviewed the records of 81 consecutive patients with anamnestic diabetes mellitus undergoing operation for femoral neck fracture between April 1975 and July 1983. Among 1290 non-diabetic patients operated on for femoral neck fracture within the same period, we selected 81 patients at random without knowledge of postoperative morbidity data but matched to the diabetics for sex, age, treatment for cardiovascular disease and weight (Table 1). For

Table 1. Preoperative data in diabetic and non-diabetic patients with femoral neck fracture

| | Diabetics n=81 | Controls n=81 |
|---|-------------------|------------------|
| Age, median (range) | 72 (52-96) | 77 (56-94) |
| Sex | 69 F 12 M | 69 F 12 M |
| Weight (kg), median (range) | 61 (46-102) | 62 (50-96) |
| Patients treated for cardiovascular disease | 29 | 29 |
| a) Heart failure | 20 | 15 |
| b) Angina pectoris | 5 | 7 |
| c) Hypertension | 6 | 7 |

respectively, in the non-diabetic group. Spinal anaesthesia was used during surgery in 53 diabetic and 59 non-diabetic patients, the remaining patients in each group receiving general anaesthesia.

The median duration of diabetes was 8 years (6 months–45 years). Seventeen patients received insulin, 44 oral antidiabetic agents and 20 were treated by diet alone. Late diabetic complications such as retinopathy and polyneuropathy were not assessed. Postoperative treatment of the diabetes was given by the medical house staff, based on four daily blood glucose tests. In patients usually treated with oral antidiabetic agents or diet, the routine treatment consisted of 2000–3000 ml 5 per cent glucose solution with 16 IU crystalline insulin (Leo®) added per litre. In insulin-treated patients, one half of the usual dose of insulin was administered preoperatively as an intermediate-acting preparation. Postoperatively, all diabetic patients received additional insulin in accordance with blood glucose determinations.

The surgical procedure consisted of three cancellous screws (12 diabetics and 19 non-diabetics), a sliding nail with McLaughlin plate (45 diabetics and 50 non-diabetics), or a replacement with Moore prosthesis (24 diabetics and 12 non-diabetics). Usually the patients were operated within 24 to 48 h after admission to the hospital.

Postoperative antibiotics were administered in most of the patients in both groups, but with a variety of drugs. Postoperative antithrombotic treatment with low-dose heparin was used in all patients from 1975 to July 1982, but not in any patient later.

The patients were not followed up after the discharge from the hospital.

The Fisher exact probability test was used to compare postoperative morbidity data in the two groups, and Student's *t*-test to compare blood glucose data. Calculation of beta and delta confidence limits was according to Feinstein (1975).

Results

One postoperative death was experienced in each group during the course of the hospital stay after the operation. There was no difference in the total number or types of complications, 19 in the diabetics and 18 in the non-diabetics, or in the number of patients with complications, 16 patients in each group (Table 2). The complications in the diabetic patients were equally distributed between patients treated with insulin, oral antidiabetic agents or diet. There was no difference in pre- or postoper-

Table 2. Postoperative complications following operation for femoral neck fracture in diabetic and non-diabetic patients

| | Diabetics n=81 | Controls n=81 |
|---------------------------------------|-------------------|------------------|
| Wound infection | 5 | 5 |
| Venous thrombophlebitis | 0 | 1 |
| Pulmonary embolism | 1 | 0 |
| Respiratory insufficiency | 0 | 1 |
| Pneumonia | 4 | 4 |
| Urinary tract infection | 9 | 6 |
| Acute myocardial infarction | 0 | 1 |
| Total morbidity | 19 | 18 |
| Number of patients with complications | 16 | 16 |

ative blood glucose concentrations between diabetic patients with and without complications. In eight patients it was necessary to regulate the preoperative blood sugar level, thereby postponing the operation. One of these patients was in the group with complications (urinary tract infection). The risk of overlooking (type 2 error) a 25 per cent difference in the incidence of a postoperative course with complications between diabetic and non-diabetic patients – that is, from the actual percentage of 20 to 25 – was less than 25 per cent. The risk of overlooking a 50 per cent increase in morbidity in the diabetic patients (from the actual percentage of 20 to 30) was less than 8 per cent.

Discussion

Our study comparing the morbidity after operation for femoral neck fracture in patients with diabetes mellitus and in matched non-diabetic controls does not support previous retrospective studies without matched controls, suggesting an increased incidence of complications in diabetic patients (Cruse & Ford 1973, Kahn et al. 1974).

Our results are in accordance with two recent studies where postoperative morbidity was not increased in diabetic patients undergoing gall bladder surgery (Walsh et al. 1982) and major vascular surgery (Hjortrup et al. 1983) compared with matched non-diabetic patients. As in our previous analysis concerning vascular surgery (Hjortrup et al. 1983), we were unable to demonstrate any relationship

between the occurrence of postoperative complications and the type of diabetes. Similarly, we found no differences in blood glucose preoperatively or during the first 4 postoperative days between diabetic patients with and without complications. Hyperglycaemia is obviously not the only factor inducing postoperative complications in diabetic patients. However, because of the limited number of patients we do not want to imply that severe dysregulation has no influence on postoperative morbidity. Likewise, our results do not exclude the possibility of postoperative morbidity being somewhat increased in patients with diabetes mellitus. However, the calculated risk of overlooking a 50 per cent increase in postoperative risk in the diabetic patients is less than 8 per cent, which corresponds with the findings in diabetic patients undergoing vascular surgery (Hjortrup et al. 1983).

Our data do not support the proposal that keeping the perioperative blood glucose between 4 to 7 mmol/l by expert teams in endocrine intensive care units will lead to any major reduction in morbidity (Palumbo 1981). More insight into this important question can only be gained by further careful, prospective

studies on the relationship between hormonal and metabolic controls and morbidity parameters following surgical procedures in diabetic patients.

References

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