

ASPECTS OF TREATMENT*

The effect of cephradine prophylaxis on wound infection after arterial surgery through a groin incision

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Summary

Cephradine administered prophylactically to a group of 35 patients undergoing reversed saphenous vein femoro-popliteal bypass, ilio-femoral endarterectomy or profundaplasty through a groin incision, resulted in a significant reduction in the incidence of wound infection ($P = 0.025$; exact probability test).

One gram of cephradine was given at induction of anaesthesia, followed by three postoperative doses of one gram at 6 hourly intervals.

The overall wound infection rate at 7 days, as assessed by frank purulent discharge, was 15%. After cephradine prophylaxis, no infections were noted as judged on this basis, but erythema of the suture line was seen in equal numbers (40% of each group).

Where the indication for operative intervention was rest pain or gangrene, the incidence of wound infection was very much increased, 80% of the infected cases being from this group.

Introduction

Most surgeons now use prophylactic antibiotics during reconstructive vascular surgery, particularly where Dacron or other prostheses are used (1, 2, 3, 4, 5). Other centres where prophylactic antibiotics are not used do not report an increased incidence of infection (6). Furthermore, there is evidence that the incidence of wound infection is increased in patients receiving such prophylaxis (7). It is, therefore, important to determine whether prophylactic antibiotics are indicated for patients who are not receiving a prosthetic implant.

Cephradine and other cephalosporins have been increasingly used prophylactically in the management of surgical patients because of their broad spectrum bactericidal activity. Cephradine is resistant to a wide range of beta-lactamases (8, 9), and can be given orally, intra-muscularly or intravenously. It is well distributed throughout most body tissues, and its efficacy in surgical prophylaxis has been demonstrated in many clinical situations (10, 11, 12, 13).

The object of this study was to determine the effect of cephradine given prophylactically to patients undergoing arterial surgery through a groin incision, in whom a prosthetic implant was not used.

Patients and methods

Thirty-five patients with peripheral vascular disease were studied following their informed consent. There were 10 females and 25 males between the ages of 49 and 88 years (mean age 68 years).

Twenty-one patients presented with intermittent claudication and 14 with rest pain and gangrene. Nineteen of the patients were treated by femoro-popliteal bypass, 4 by combined femoro-popliteal bypass and ilio-femoral endarterectomy, 8 by ilio-femoral endarterectomy alone, and 3 by profundaplasty; and one patient had a femoral embolectomy.

The randomisation was done by drawing cards, and produced equivalent groups with respect to indication for surgery, and type of operation (Table I).

TABLE I. Operation types

Operation	Cephradine group	Control group
Femoro-popliteal bypass n = 19	10	9
Ilio-femoral endarterectomy and femoro-popliteal bypass n = 4	3	1
Ilio-femoral endarterectomy n = 8	5	3
Profundaplasty n = 3	2	1
Femoral embolectomy n = 1	0	1
Totals	20	15

One group of patients received one gram of cephradine intravenously at induction of anaesthesia, and subsequently 3 postoperative doses of one gram intravenously at 6 hourly intervals. On a single blind basis the controls received an equivalent volume of isotonic saline intravenously.

Skin preparation prior to surgery was from umbilicus to ankle using 10% Povidine Iodine. All wounds were closed with Dexon to subcutaneous fat, and continuous nylon to skin. A Redivac suction drain was used in each case, and removed 36 hours postoperatively.

At 7 days the groin wounds were reviewed by the same individual and classified into three groups: (1) clean, (2) suture-line erythema, (3) infection with sero-sanguinous or purulent discharge. Whenever wound discharge was noted, microbiological swabs were taken for culture.

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The Editor would welcome any comments on this paper by readers

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Results

No morbidity or mortality was associated with the administration of cephadrine. Two patients died from myocardial infarction within 4 days of their operation.

Suture-line erythema (Grade 2) was found in approximately 40% of both groups of patients (Table II). Table III shows the wound state at 7 days.

TABLE II Wound classification at 7 days

Wound grade	1	2	3
Cephadrine n = 18	11	7	0
Controls n = 15	4	6	5
Total n = 33	15	13	5

Grade 1 = clean

Grade 2 = suture-line erythema.

Grade 3 = infection with sero-sanguinous or purulent discharge.

*p = 0.025; exact probability test

TABLE III Wound classification at 7 days according to indication for operation

Wound grade	1	2	3
Intermittent claudication n = 21	12	8	1
Rest pain and gangrene n = 12	3	5	4
Total n = 33	15	13	5

Of the *no antibiotic* group, 5/15 (33%) patients developed wound infection with purulent discharge. In the *cephadrine* group of 18 patients no Grade 3 infections occurred.

Microbiological information was available from swabs taken from cases with wound discharge. Two patients had wounds infected with *Staph aureus*, two with *Staph albus* and one with *E Coli* and *Proteus*. If the indication for surgery is considered, of the 33 patients inspected (Table III) 3 of 12 patients with rest pain and gangrene had clean (Grade 1) wounds (25%), whereas with intermittent claudication as the indication, 12 out of 21 had clean wounds (57%).

OTHER INFECTIONS

Four patients, three from the *no antibiotic* group developed significant urinary tract infections requiring co-trimoxazole or ampicillin according to organism sensitivity. (Each patient was catheterized at the time of surgery.)

These antibiotics were in each case required seven days or more after the original surgery, and so did not affect the wound assessment.

Discussion

The indiscriminate use of antibiotics can result in the development of numerous bacterial strains resistant to antibiotics. Prophylactic use of antibiotics must therefore be reserved for situations where postoperative infections are a serious problem, and where it is clear that the drug used reduces the frequency of such infections.

Incisions in the groin may be more liable to infection (3, 6), because this area is often moist, and *Staph aureus* is often carried at this site. In addition, lymphatics damaged by this incision may drain a distal infected focus. The importance of

this is shown by the wound infection rate in operations performed for rest pain and gangrene; 80% of the infected wounds in this series occurring in such patients. In fact, only 25% of patients presenting with rest pain and gangrene had a Grade 1 (clean wound postoperatively) and similar findings have been reported by other authors (4).

It is interesting that all five severely infected wounds in this series occurred in patients undergoing femoro-popliteal bypass procedures. It may be that the combination of the groin incision with other more distal incisions in closer proximity to any skin breaches, is more likely to lead to infection (14).

In the initial design of the trial a decision was taken to analyse the results at the end of the first 50 cases. As the efficacy of antibiotic prophylaxis became clear, and as statistical significance had been achieved, it was felt unethical to continue the trial further.

The incidence of infection seen in this series (15%, representing 5/35 patients) appears higher than that reported by others (15, 16). Cephadrine prophylaxis has reduced the wound infection significantly, and it is now our policy to use this regime routinely.

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