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★

< >

:

가

:

22

0.5 cm

14 cm

가

17

4

6

5.4

5

:

27

62

45

1

1

, 100

가 14

80

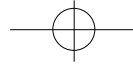
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* 1999





4,12)

2mm

(flexible reamer)

12)

가

1991 1

1992 12

22

4,5,19)

14

vancomycin

, 8

5

gentamicin

3

cephalosporin

가

8,10,14)

vancomycin (), 3 cephalosporin

cefotaxim (), gentamicin() 가

, 1gm

1993 3 1996 10

(Osteobond; Zimmer, Warsaw, IN, USA) polymer 40gm
(methyl metacrylate
monomer)

22 22

가 19 , 가 3

18

57

33

. 8

가

14 가

Dynar Exter (Hyupjin, Seoul,
Korea) 15 , Ilizarov (Smith-Nephew,
Memphis, TN, U.S.A.) 4 , Ilizarov Dynar
Exter 3

가 3

10

12

17 (77%)

, 5 (23%)

17

11

6

(closed suction drainage catheter)

가

36

4

2

2

10

1

2 cephalosporin

1gm 3

9

4.3

amikacin

250mg 2

가

C-

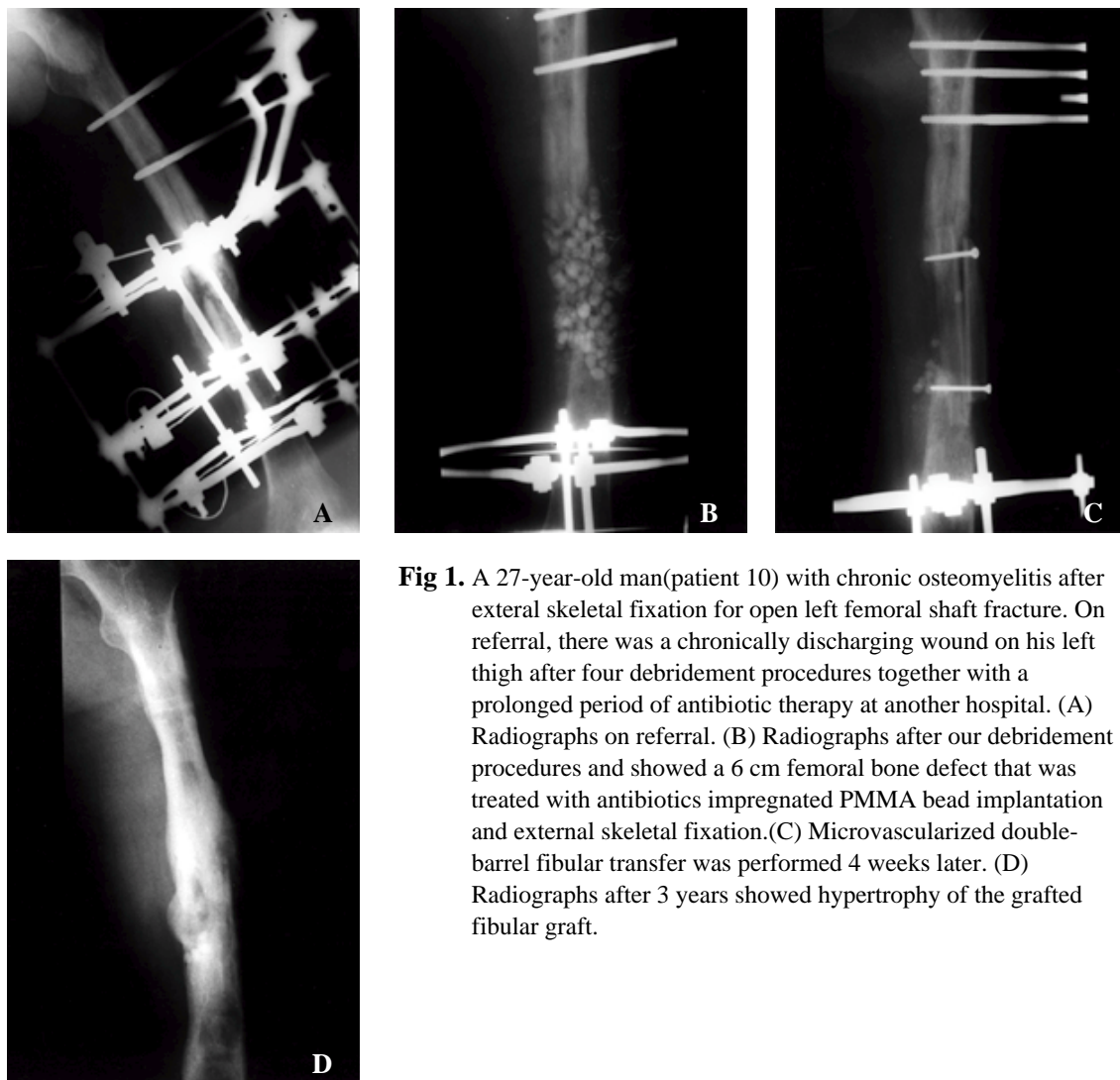


Fig 1. A 27-year-old man(patient 10) with chronic osteomyelitis after external skeletal fixation for open left femoral shaft fracture. On referral, there was a chronically discharging wound on his left thigh after four debridement procedures together with a prolonged period of antibiotic therapy at another hospital. (A) Radiographs on referral. (B) Radiographs after our debridement procedures and showed a 6 cm femoral bone defect that was treated with antibiotics impregnated PMMA bead implantation and external skeletal fixation.(C) Microvascularized double-barrel fibular transfer was performed 4 weeks later. (D) Radiographs after 3 years showed hypertrophy of the grafted fibular graft.

4 6

8.5 cm(6-

14cm) (Fig. 1). 가

(Zimmer, Warsaw, IN, USA)

Pulsavac

1

가 4 cm

17

(77.3 %) 가

. 가

6 cm

5 (22.7%)

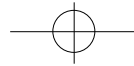
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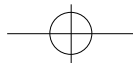
(Table 1).

**Table 1.** Data for patients

Patient	Age/Sex	Lesion site	Previous hardware	Bacteria	Antibiotics	Bone defect	Bone graft	Fixation time	Knee motion	Complication
1	30/M	proximal	Plate & Screws	S. aureus	Vancomycin	3 cm	cancellous	32 weeks	120	Nil
2	22/M	middle	flexible nail	S. aureus	Vancomycin	3.5 cm	cancellous	20 weeks	70	Nil
3	48/F	middle	Locked nail	S. aureus	Vancomycin	2.5 cm	cancellous	52 weeks	60	2 cm LLD
4	25/M	distal	External fixator	S. aureus	Vancomycin	4 cm	cancellous	40 weeks	40	Nil
5	27/M	middle	Locked nail	S. aureus	Vancomycin	1.5 cm	cancellous	20 weeks	100	Nil
6	20/M	distal	External fixator	S. aureus	Vancomycin	8 cm	V.F	32 weeks	40	Nil
7	26/M	distal	External fixator	unidentified	Vancomycin	14 cm	V.F	40 weeks	15	3.5 cm LLD
8	35/M	proximal	Locked nail	S. epidermidis	Vancomycin	7.5 cm	V.F	50 weeks	100	Nil
9	39/M	proximal	Plate & Screws	S. aureus	Vancomycin	0.5 cm	cancellous	37 weeks	110	Nil
10	27/M	middle	External fixator	S. aureus	Vancomycin	6 cm	V.F	24 weeks	100	Nil
11	28/M	distal	Locked nail	S. aureus	Vancomycin	1 cm	cancellous	27 weeks	100	Nil
12	26/M	middle	Locked nail	S. aureus	Vancomycin	0.5 cm	cancellous	24 weeks	120	Nil
13	57/F	distal	Plate & Screws	S. aureus	Vancomycin	2 cm	cancellous	36 weeks	80	2 cm LLD
14	18/M	distal	Plate & Screws	P. aeruginosa	Cifloproxacin					
15	51/M	middle	Locked nail	S. aureus	Vancomycin	0.5 cm	cancellous	37 weeks	120	Nil
16	34/F	distal	External fixator	S. marcescens	Gentamicin	0.5 cm	cancellous	39 weeks	120	Nil
17	27/M	middle	Locked nail	S. aureus	Vancomycin	7 cm	V.F	54 weeks	30	varus deformity
18	35/M	proximal	Locked nail	unidentified	Vancomycin	3 cm	cancellous	41 weeks	110	Nil
19	28/M	proximal	Locked nail	S. aureus	Vancomycin	2 cm	cancellous	39 weeks	120	Nil
20	31/M	proximal	Locked nail	S. aureus	Vancomycin	2 cm	cancellous	42 weeks	110	2 cm LLD
21	30/M	proximal	Plate & Screws	S. aureus	Vancomycin	0.5 cm	cancellous	38 weeks	120	Nil
22	53/M	distal	Plate & Screws	P. aeruginosa	Cifloproxacin					
21	30/M	proximal	Plate & Screws	S. aureus	Vancomycin	2.5 cm	cancellous	37 weeks	110	2.5 cm LLD
22	53/M	distal	Plate & Screws	S. aureus	Vancomycin	4 cm	cancellous	56 weeks	80	Nil

cancellous : autogenous cancellous bone graft, V.F : vascularized fibular graft

[illegible]



3

50%

1,13)

가

8

가

가¹¹⁾

1

가

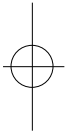
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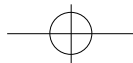
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Abstract

Two Stage Treatment of Infected Nonunion of Femur with Antibiotics Impregnated Cement Beads and External Fixator

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PURPOSE : The purpose of this study was to find out the treatment efficiency of two stage osteosynthesis with antibiotic cement beads and external skeletal fixation for infected nonunion of femur.

MATERIALS AND METHODS : In the first stage, radical debridement was performed. The soft tissue and bony defects were filled with antibiotics impregnated cement beads and the nonunion site was stabilized with external skeletal fixation. In the second stage, the debrided nonunion site was repaired with bone grafting. The intervening time between the first and second stages of treatment was 4 to 6 weeks (average 5.4 weeks). The bone defects ranged from 0.5 to 14cm, Autogeneous iliac cancellous bone grafting was performed in 17 patients and microvascularized fibular graft was performed in 5 patients.

RESULTS : The follow-up period was average 45 months (range, 27-62 months). Infection control and bone union were achieved in all 22 cases. Postoperative infection after the second-staged bone grafting occurred in one patient. This recurred case was treated with repeated two staged operation. Even though aggressive physical therapy was done, all patients had relevant knee flexion deficits. 14 patients were achieved more than 100 degrees of knee flexion, but 8 patients had less than 80 degrees of range of motion.

CONCLUSION : We have found that two-stage treatment with antibiotic beads local therapy, external skeletal fixation, and staged bone grafting is an acceptable treatment modality for the management of infected femoral nonunion. It results in rapid recovery from osteomyelitis and a predictable recovery from nonunion.

Key Words : Femur, Infected nonunion, Antibiotic cement beads, External fixation, Two-stage treatment

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