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= Abstract =

Proximal Tibiofibular Fracture associated with Popliteal Artery Injury

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Injury to the popliteal artery results in amputation more frequently than any other arterial injury. The major factor in the amputated limbs was a delay in diagnosis and therapy of the arterial injury associated with blunt trauma. The proximal tibial fractures produced the highest percentage of vascular complications and indicated immediate application of therapeutic measures. The purpose of this study is to investigate the long-term results and factors that influences the results of surgical treatment in patients with combined proximal tibial fracture and popliteal artery injury. Authors reviewed the records of 24 cases treated for this injury between January 1984 and May 1997. The age of the patients ranged from 17 to 70 years(average 45 years). Nine patients presented with life threatening injuries and classical signs of acute limb ischemia. Prolonged ischemic time ranged from 3 to 6 hours 30 minutes(average 4 hours 50 minutes). The most common cause of thoses injury was traffic accident in 16 cases. Five cases had neurologic deficit ; significant soft tissue injury was present in 14 extremities. Vascular procedures included saphenous vein interposition, end-to-end anastomosis, etc. Bony procedures

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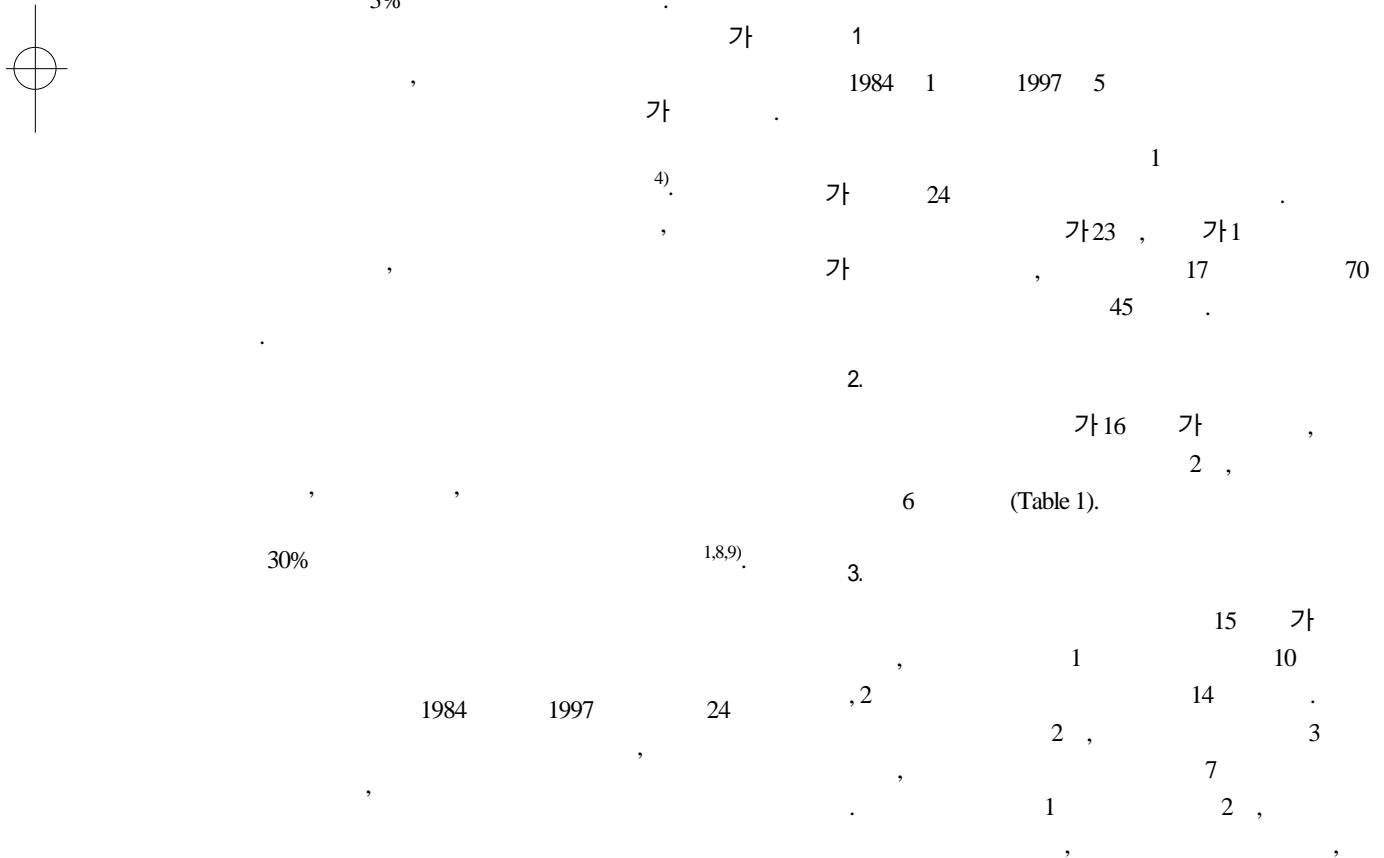
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were accomplished by external means in 14 cases and the others treated by immediate internal fixation in 5 cases. Intraoperative fasciotomy was performed in 5 patients with lower limb ischemia.

The results suggested that limb salvage was possible in 63 percent of patients with combined proximal tibial fracture and popliteal artery injuries, but a history of life-threatening condition and severe associated injury with vascular compromise was an unfavorable prognostic factor. So a well organized multidisciplinary approach is necessary to ensure life and functional limb salvage..

Key Words : Proximal tibial fracture, popliteal artery injury



**Table 1.** Clinical Data of Proximal Tibiofibular Fx associated with Popliteal Artery Injury

Age/ Sex	Ischemic Time	Associated Injury	Op.Method	Functional Result
40/M	9 : 30	Fx. shaft femur Lt. Fx. forearm bone both Lt.	En	E
69/M	11 : 40	Rup. of ant. tibia A. & popliteal V.	En	G
50/M	10 : 50	Rup. of popliteal V.	V	E
17/M	11 : 30	Fx. shaft femur Lt.	V Ect.1	P
26/M	9 : 20	Fx. shaft femur both.	L	P
34/M	23 : 30		L	P
41/M	7 : 30	Fx. shaft femur Lt. Fx. trimalleolar Lt	L	P
61/M	10 : 30	Rup. of popliteal V.	En	G
31/M	8 : 30	Fx. shaft femur Lt. Fx. shaft tibia Lt.	L	P
60/M	11 : 10	Fx. supracondyle femur Rt.	V	G
64/M	10 : 40		V	E
26/M	10 : 00	Fx shaft femur Lt. ACL& PCL MM injury Lt	En	F
57/M	11 : 30		En	E
44/M	8 : 40	vein rup	L	P
42/M	10 : 30	vein rup	En	E
46/M	10 : 50		Pv	E
37/M	11 : 30	Rup. of popliteal V	En	E
60/M	9 : 40	Fx. shaft tibiofibular Open knee injury Lt.	V	F
46/M	11 : 10		V	E
40/M	12 : 30	Fx. shaft femur Lt.	V Ect.1	P
70/M	10 : 20		En Ect.1	P
38/M	10 : 20	Fx. shaft tibia Lt. Fx. comm. distal radius	V	E
55/M	10 : 30	Knee joint D/L	V	E
28/F	11 : 40	Fx. comm. prox. femur Lt.	En Ect.1	P

En : End to end anastomosis V : Autogenous vein graft Pv : Prosthetic vessel graft
L : Ligation Ect.1 : Delayed amputation Ect. 2 : Release of incarcerated vessel
E : excellen G : good F : fair P : poor

(Table 1).

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4.

(double

incision fasciotomy)

15),
10

5

.(Fig. 1,2)

14

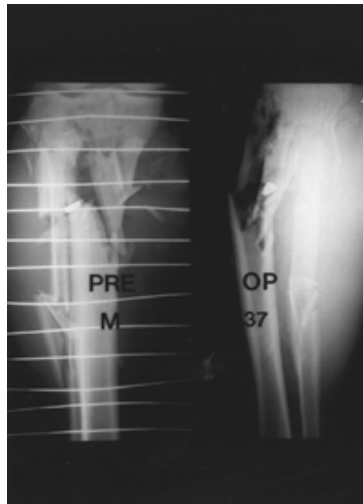
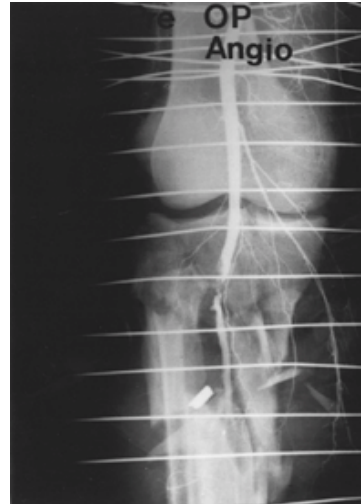
**Fig 1****Fig 2**

Fig 1. 37-year-old man with open IIC communitied fracture of proximal tibia.

Fig 2. Preoperative arteriogram shows obstruction of popliteal artery and proximal tibia fracture.

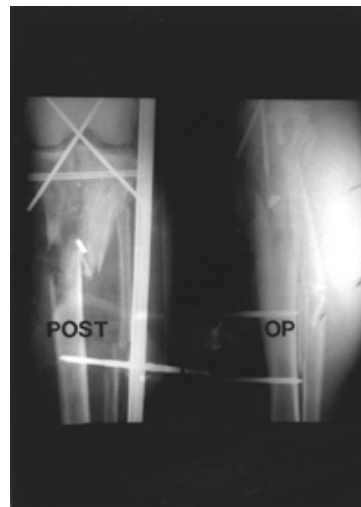
**A****B**

Fig 3-A. The fracture was treated by open reduction and internal fixation with T-plate.

Fig 3-B. The fracture was treated by close reduction and conventional external fixation with cannulated screws & Steinmann pins

(Fig. 3).

2

10 , (partial rupture) (transection) 13 ,

(incarceration) 1 .

(adductor muscle) (gracillis)

가

가

popliteal approach) 15 , (medial (posterior

popliteal approach) 1 ,

(lateral popliteal approach) 1 ,

8 ,



가 10 , , 가2 .

1 , : 1 16

5 , 2 , 5 , ,

(Fig. 4). 가 2

12 3 4 가 .

5 , 14

1) , , ,

: 가4 .

24 , 21%

2) (Table 1,4)

5 , 가9 , 1 1

9 , 1 . 1 19

10 50 ,

2 가 5

(Table 1, 2). 11 30 .

3 가1 19

Table 2. Method of vascular Surgery

Method	No.	No. of Amputation	Amputation Rate(%)
End to end anastomosis	9	2	22
Autogenous vein graft	9	2	22
Prosthetic graft	1	0	0
Ligation	5	5	100
Total	24	9	37

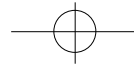
Table 3. Functional Result*

Excellent	: No motor & sensory deficit Full range of motion
Good	: Motor, sensory deficit or limitation of motion, but do not require other surgical procedure
Fair	: Motor, sensory deficit or limitation of motion and require other surgical procedure
Poor	: Amputation

* This result was made by one of our authors.

Table 4. Relations between groups by functional result and ischemic time

Group	Time	No. of cases
Excellent	10hr. 40min.	10
Good	11hr. 10min.	3
Fair	9hr. 50min.	2
Poor	11hr. 30min.	9



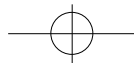
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15
4 40 , 2 4
5 5 20 , 1
5 8 15 .
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3 20 ,
15 6 , 2
4 6 10
15
2 4
(Mann-Whitney Test: P=0.108).



Fig 4. Postoperative arteriogram shows normal arterial circulation

3)
가 15 1
10
, 3 2
, 2
(Excellent)
(Good), (Fair), (Poor)
3), 가 15
(Table 4).
가 가
, Smith²⁴⁾
Chapman⁵⁾
5,21)
10 40 , 2
11 30
0-42%
10,23)
37%
MacDonald⁷⁾
Downs &
Snyder²⁵⁾
Alberty⁴⁾
6
가
13)
6 31
32%
가
72.5%
(Table
(Excellent)
, 2
, 3
10
15
가
3)
(Good), (Fair), (Poor)
(Table 4).
가 가
, Smith²⁴⁾
Chapman⁵⁾
5,21)
10 40 , 2
11 30
0-42%
10,23)
37%
MacDonald⁷⁾
Downs &
Snyder²⁵⁾
Alberty⁴⁾
6
가



10 40 , 2
30

Mann-Whitney

11

가 2 , 가
가 2
가 2 .

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가 ,^{1,3,6)}

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11,13,14,20,27)

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(adductor hiatus)

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3.

^{21,22)}

1.5cm

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²²⁾

5.

가

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fracture)

가

(oblique

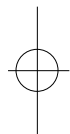
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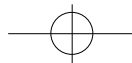
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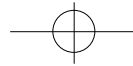
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