

Successful Replantation of an Amputated Foot in an Elderly Diabetic Patient: Case Report

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Abstract: Researchers have reported of a successful replantation for an elderly diabetic person. In this case, the amputation was not crush and avulsion and the duration time between trauma and starting surgery was only 4 h. For evaluate the worth of replantation, few grading systems related to preoperatively diagnosed injury severity have been used to help predict the functional outcome.

Key words: Replantation, diabetic person, diagnosed injury, severity, grading system, Iran

INTRODUCTION

There have been fewer reports of lower extremity replantation than of upper extremity cases. Replantation of lower extremities are rare due frequent complications in lower limb salvage procedures, severe general complications such as cardiac and renal failure or local complications such as necrosis, infection, non-unions the need for secondary lengthening, compartment syndrome or other reconstructive procedures (Usui *et al.*, 1979).

In addition, a patient undergoing lower leg replantation who is stable prior or during operation, may become unstable in the postoperative course because of systemic influence of the replanted extremity and ultimately may die because of replantation. Replantations of amputated legs in elderly patients have rarely been reported, especially in diabetic elderly patients. Atherosclerotic arteries in these patients decrease chance of revascularization (Clarke and Mollan, 1994).

Diabetic patients are prone to renal failure after prolong operation because of background renovascular disease (Lesavoy, 1979). Sensory neural deficiency, peripheral vascular disease, renovascular diseases and poor healing of ulcer are other complications of diabetic patients. Diabetes mellitus is one of the risk factors for development of surgical site infections that should be consider after any procedures on diabetic patients (Yaffe *et al.*, 1991).

MATERIALS AND METHODS

On the 20th April, 2008, a 60 years old woman who was working with a grass-cutting. She was taken to Emam

Reza University Hospital with the amputated foot which was cooled down, clean dressing and the bleeding in the stump was controlled with compressive bandage. Right foot was complete amputated sharply from ankle joint (Fig. 1). The patient arrived at Emam Reza University Hospital by ambulance 3 h after the accident. She was in grade 2 of shock and reanimate with 2 lit of normal saline infusion. Initial blood sugar was 210. Her left lower foot had been traumatically amputated above the ankle. She was immediately anesthetize with general anesthesia. After initial debridement and wound cleaning first 2 pins were inserted through ankle toward tibia and fibula bone. Then great saphenous vein was anastomosed with 7-0 prolene sutures after irrigation with heparinized saline (100 U mL^{-1}). There after, the posterior tibial artery (diameter 3 mm) were repaired with 7-0 prolene sutures. The dorsalis pedis artery (diameter 3 mm) was also



Fig. 1: Photo of the right foot that was complete amputated sharply from ankle joint



Fig. 2: Photo of the right foot after operation



Fig. 3: Photo of the right foot 2 months after operation

repaired with 7-0 prolene sutures and the circulation in the foot was good with palpable distal pulses. The total ischemia time from the time of injury to the reperfusion was 4 h. Branches of tibial nerve were replaced in its original traces.

After that other soft tissue and tendons were repaired and finally an external fixator was included. Her blood sugar was monitored during operation and she was transfused with 2 units of packed RBC and the urine was alkalinized. She received 8 million units of penicillin G and 4 g of cefazolin-sodium daily and prophylaxis with low-molecular-weight heparin during the 1st week; no signs of infection developed.

Her blood sugar was monitored and was controlled with regular insulin every 6 h. After the procedure, no additional blood transfusion was performed Fig. 2 and 3. The postoperative course was uneventful and there was no general complication such as replantation toxemia. About 4 weeks after the initial injury partial weight-bearing was allowed. After 6 months, she began to walk without assistance (Fig. 4). At 16 months postoperatively,



Fig. 4: Photo of the right foot 6 months after operation

she has almost completely regained full range of motion at the ankle. She feels deep cutaneous touch and pain sensation with high-quality proprioception in all parts of her foot.

RESULTS AND DISCUSSION

There have been fewer reports of lower extremity replantation than of upper extremity cases due to the high risk of developing both general and local complications and poor functional prognosis. Also, patients with lower limb amputation tend to have associated injuries and present hemorrhagic shock. The general conditions are often too serious to perform replantation surgery and motor and sensory functions in the ankle and toes are usually poor. In addition, below-knee prostheses are highly effective compared with upper-extremity prostheses. Georgiadis *et al.* (1993) reported that early below-knee amputation in patients with open tibial fractures with severe tissue lost resulted in a quicker time to recovery and reduced long-term disability. Extensive tissue damage, especially of the muscle tissue, leads to local and systemic reaction. Ischemia time is also crucial to diminish postoperative complications. In this case, the amputation was not crush and avulsion and the duration time between trauma and starting surgery was only 4 h.

For evaluate the worth of replantation few grading systems related to preoperatively diagnosed injury severity have been used to help predict the functional outcome. The Mangled Extremity Severity Score (MESS) described by Johansen *et al.* (1990) offers additional help in decision making. In cases presenting a score above >7, a significantly higher complication rate and worse functional result have to be anticipated. MESS previous health status have not been considered but other scoring systems have attempted to rectify this.

Table 1: Chen criteria of replanted lower limbs*

Grades	Description
I	Return to previous work; normal gait walk; almost normal sensory recovery at the sole; almost normal range of movement of knee and ankle joints
II	Return to light work; walk with slight limp; good sensory recovery of the sole; range of movement >40% of normal
III	Useful in daily life; use of higher heel; poor sensibility at the sole without trophic ulcers
IV	Use of crutches; no sensory recovery at the sole; trophic ulcers

This latter scoring system specifically looks at ischaemia time (warm and cold) as well as scoring soft tissue injuries/involvement (Datiashvili and Chichkin, 1992).

A total of 8 or more is a contraindication to replanting the affected lower limb in battiston scoring system 2 point was given to patients with poor previous health status (systemic disease as diabetes or hypertension and heart disease). The skeletal shortening necessary for the adequate debridement of devitalized tissues and tension-free primary nerve repair will cause an undesirable leg length discrepancy. In this case, limb shortening was only 1 cm. Lower extremity replantations are usually indicated in young people and infants (Georgiadis *et al.*, 1993). As for elderly patients, there have been very few reports of successful lower extremity replantation. Since, these patients often have blood-vessel diseases in the lower extremities, age is one of the main risk factors in replantation surgery (Table 1).

CONCLUSION

There has been no report of successful replantation for an elderly diabetic person. With such conditions as in the patient we report. Functional results of replanted

lower limbs should be considered. Chen grading system described functional results of replanted lower limbs this case, the functional results was Chen grade I (Zong-Wei *et al.*, 1981).

REFERENCES

- Clarke, P. and R.A. Mollan, 1994. The criteria for amputation in severe lower limb injury. *Injury*, 25: 139-143.
- Datiashvili, R.O. and V.G. Chichkin, 1992. Successful replantation of the lower leg after 42-hour ischemia: Case report. *J. Reconstr. Microsurg.*, 8: 447-453.
- Georgiadis, G.M., F.F. Behrens, M.J. Joyce, A.S. Earle and A.L. Simmons, 1993. Open tibial fractures with severe soft-tissue loss. Limb salvage compared with below-the-knee amputation. *J. Bone Joint Surg. Am.*, 75: 1431-1441.
- Johansen, K., M. Daines, T. Howey, D. Helfert and S.T. Hansen Jr., 1990. Objective criteria accurately predict amputation following lower extremity trauma. *J. Trauma*, 30: 568-572.
- Lesavoy, M.A., 1979. Successful replantation of the lower leg and foot, with good sensibility and function. *Plast. Reconstr. Surg.*, 64: 760-765.
- Usui, M., M. Minami and S. Ishii, 1979. Successful replantation of an amputated leg in a child. *Plast. Reconstr. Surg.*, 63: 613-617.
- Yaffe, B., A. Borenstein, D. Seidman and Y. Amit, 1991. Successful replantation of both legs in a child-5-year followup: Case report. *J. Trauma*, 31: 264-267.
- Zong-Wei, C., V.E. Meyer, H.E. Kleinert and R.W. Beasley, 1981. Present indications and contraindications for replantation as reflected by long term functional results. *Orthop. Clin. North Am.*, 12: 849-870.