Descending genicular vessels as recipient pedicle for free flap cover of complex defects around upper and mid-lower third junction of tibia

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Dear Sir,

Selection of ideal recipient vessels is one of the most important factors determining success in free-flap reconstruction of the lower limb. For defects at the knee, upper and mid third tibia; the choice of vessels has traditionally been either the common femoral or the popliteal and their branches [1]. The descending genicular artery a branch of the superficial femoral artery, is 1.5–2 mm in size. It originates approximately 13 cm from knee joint. It passes distally between the sartorius and the vastus medialis [2]. Use of the descending genicular vessels for knee reconstruction was first described in three cases by Park and Eom [3]. More recently, this artery has been used more extensively as a source of vascularised corticoperiosteal grafts from the medial femoral condyle [4].

We hereby present a series of three patients in whom descending genicular vessels were used as a reliable recipient for free flaps covering upper and mid-lower third leg defects. All three patients were males in their third

decade with motor vehicle accidents. They presented with GIIIB defects of upper & mid-lower third leg. They had significant crush injury which limited the local/regional options as gastrocnemius muscle was crushed. All three had skin loss with internal degloving of the skin. CTAngiography showed single vessel leg in all three; with sensate foot. Free flap reconstruction was haunted with recipient vessel issues as the popliteal vessel and its branches were often in the zone of trauma and was difficult to access, as it often needed change in patient position. The only options for the recipient vessels in the past with similar injuries were - long vein grafts onto superficial femoral artery or arteriovenous (AV) loops; both having their complications. These above mentioned factors posed real reconstructive challenge. This recipient vessel as a choice acted as a life boat in saving limbs. All patients had initial fracture stabilisation with external fixation followed by internal fixation and free latissimus dorsi muscle flap cover. Entire procedure was performed in lateral position enabling a two team approach of simultaneous flap harvest and recipient vessel preparation. Split skin graft was applied over the free latissimus dorsi muscle in the same setting (Fig. 1 depicting case 1). All patients recovered well with uneventful post-operative course and had normal gait within 6 months period.

Thus the use of the descending genicular artery as recipient vessel has various advantages including: (i) its remote from the zone of trauma, (ii) constant in location, (iii) excellent size match for end-to-end anastomosis, (v) simultaneous two team approach, (vi) it obviates the need of AV loops and the complexity associated with vein grafts. To the best of our knowledge this is the only

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Fig. 1 **a** mid-lower third Grade IIIB tibial fracture defect post debridement of gastrocnemius muscle. **b** Micro clamp on the descending genicular vessels. **c** Reconstruction with free latissimus dorsi muscle flap. **d** 6 month follow up showing well settled flap and skin graft with near normal gait

series where descending genicular vessels were used as recipient for free flaps, to cover Grade IIIB defects as low as mid-lower third junction of the tibia; in patients with single vessel leg.

Compliance with ethical standards

Disclosure of potential conflicts of interest All authors declare that there are no conflicts of interest.

Research involving human participants All procedures performed in studies were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

Level of evidence Level V, therapeutic study.

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