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Lateral supragenicular pedicle perforator flap: Clinical results and vascular anatomy[☆]

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KEYWORDS

Lateral supragenicular artery;
Knee reconstruction;
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Summary Background: The lateral supragenicular artery flap has been previously described for soft-tissue reconstruction around the knee. It provides an excellent alternative to muscle and musculocutaneous flaps with less morbidity. The evolution of the understanding of perforator flap anatomy has increased their clinical use and improved flap design.

Methods: The authors present a series of cadaveric anatomic studies to further delineate the anatomy of the lateral supragenicular pedicled perforator (LSGAP) flap. The lateral genicular perforator was injected with barium sulphate to locate and map the perforator vascular territories, zones of perfusion and location in relation to standard bony landmarks. Two case presentations exemplify the clinical application of the anatomic findings.

Results: Anatomic dissections and selective injection of the genicular perforator found consistent anatomic attributes of pedicle location, axis of flow, linking vessels and vascular territory. LSGAP flaps were used in the case presentations with excellent flap viability and coverage.

Conclusions: The LSGAP is another option for soft-tissue coverage around the knee and popliteal fossa. The morbidity is minimal as the donor site may frequently be closed primarily without incurring functional impairment. The anatomy of the lateral supragenicular perforator perforator is reliable and consistent resulting in an additional dependable flap option in our reconstructive armamentarium for coverage of knee and popliteal defects.

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Soft-tissue reconstruction options around the knee continue to expand. Numerous knee reconstructive variations of flaps have been described, including several muscle, fasciocutaneous and free flaps with the gastrocnemius as the gold standard and workhorse.^{1–10} Availability of options are particularly important in cases of trauma and amputations where the gastrocnemius may not be available. As the popularity of perforator flaps evolves, the

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The lateral supragenicular artery flap has been previously described for knee coverage in the literature.^{11–15} In 1989, Laitung found that 86% of posterolateral thigh flaps were supplied by the lateral superior genicular artery.¹¹ In 1990, Hayashi found the superior lateral genicular artery flap to be reliable.¹² In line with the evolution of perforator flaps, the authors present a series of cadaveric anatomic studies to further delineate the anatomy of the lateral supragenicular perforator (LSGAP) flap. Two case presentations exemplify the clinical application of the anatomic findings.

Methods and materials

Anatomical study

An anatomical study was performed on 28 lower limbs from 14 fresh adult cadavers acquired through the Willed Body Program at the University of Texas Southwestern Medical Centre. Specimen dissection was performed under loupe magnification and analysed for locations of the lateral supragenicular artery perforators at the suprafascial level. We recorded the distance of each perforator from the bony landmark of the superolateral patella and its relationship laterally and proximally.

The lateral supragenicular perforator zone of perfusion and vascular territory, perforasome, was further delineated by selectively injecting the first perforator. An adipocutaneous flap was harvested off of a lower limb, with the margins being the groin crease, inferior level of the patella and mid-axial anterior and posterior thigh. The lateral supragenicular artery perforator was selectively cannulated with a 24-gauge catheter and injected with a barium–gelatin mixture. The mixture was prepared by warming 100 ml of normal saline to 40 °C and adding 3 g of gelatin while stirring continuously. This was followed by slowly adding 40 g of barium sulphate. The flap was then frozen for at least 24 h before being subjected to computed tomography (CT) scanning. Three-dimensional (3-D) images were viewed using the TeraRecon Aquarius workstation (TeraRecon Inc., version 3.2.2.1, San Mateo, CA, USA). This

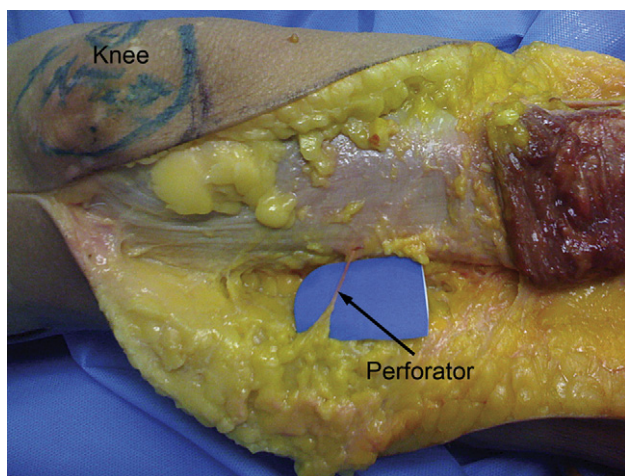


Figure 1 Cadaveric dissection of a lateral supragenicular perforator.

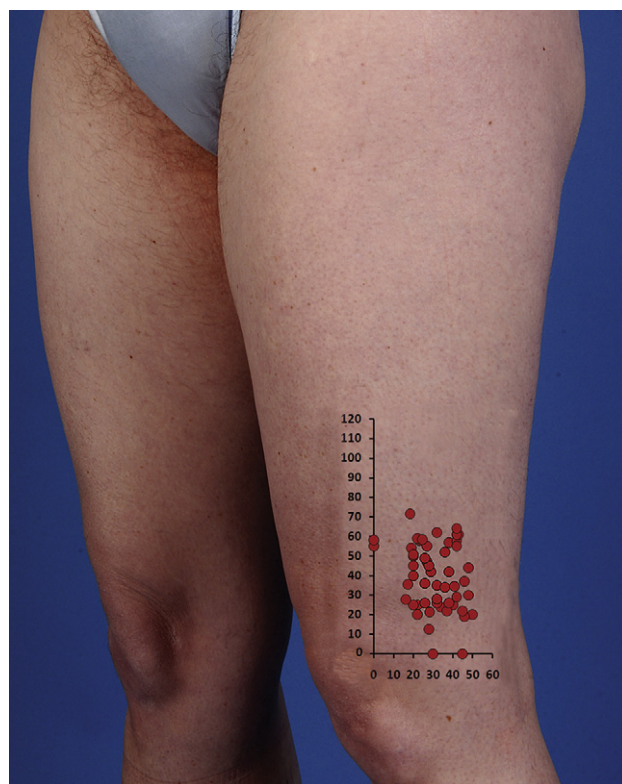


Figure 2 Location of lateral supragenicular perforators transposed onto a patient's thigh (x = horizontal distance and y = vertical distance from supeo-lateral patella, units in mm).

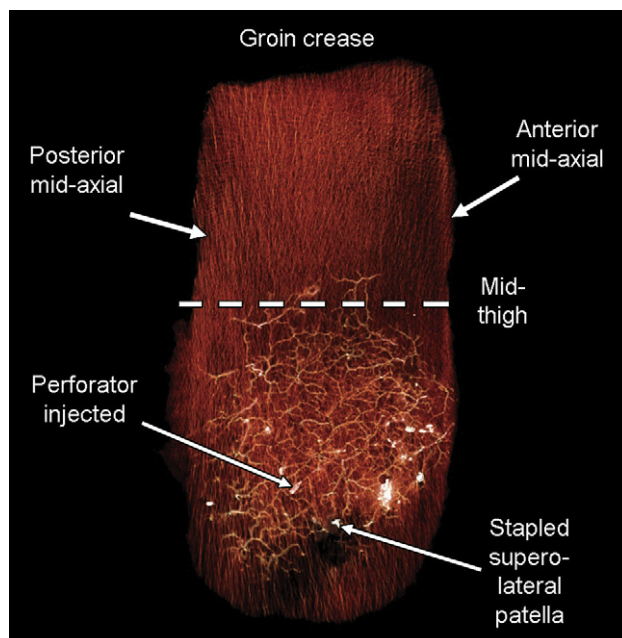


Figure 3 3D CT angiogram of injected lateral supragenicular perforator adipocutaneous flap, AP view (Margins: groin crease, inferior level of the patella, anterior mid-thigh and posterior mid-thigh).

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