Alternative Vascular Pedicle of the Anterolateral Thigh Flap: Does an Oblique Branch Really Exist?

Sir:

We read with interest the article by Wong et al.¹ and the recently published letter to the editor by da Costa and Lancellotti² concerning the oblique branch of the lateral circumflex femoral artery. Wong et al. described a distinct vascular pedicle lateral to the descending branch of the lateral circumflex femoral artery (which was present in 35 percent of their clinical cases) and stated that this vessel was as yet unnamed.

A claim to have identified a completely new branch in the well-known vascular system of the lateral circumflex femoral artery should, however, be made with caution. It implies of course a thorough understanding of the valid international terminology and the anatomical literature. Moreover, this finding should be based on an anatomical study with a representative number of specimens. According to the description of Wong et al. and the diagram in Figure 1, the lateral circumflex femoral artery splits into two main branches, a transverse and a descending one. The branches between these main branches are designated as the new “oblique branch.” This is in contrast to international anatomical terminology³ and the German and English literature, which do not list an oblique branch of the lateral circumflex femoral artery.³⁵ This, of course, would not exclude the existence of such a branch. However, following the “classic” descriptions, the lateral circumflex femoral artery splits into three branches, the ascending, the transverse, and the descending branches. According to the description of Thiel, the ascending branch crosses underneath the rectus femoris muscle to supply the tensor fasciae latae muscle. The transverse branch generally arises from this ascending branch and runs laterally and ventral to the vastus intermedius muscle. Most of its branches enter the vastus lateralis muscle. The descending branch, which may arise from the femoral artery directly, runs distally between the rectus femoris and vastus intermedius muscles. The same description can be found in Gray’s Anatomy⁴ and in the corresponding author’s recently published book.⁴ By applying these descriptions to the work of Wong et al. and the diagram, the so-called oblique branch could in fact be the transverse branch of the lateral circumflex femoral artery.

In contrast, in this study, the “oblique branch” was only present in 35 percent of the cases, which is in contrast to the constant presence of this branch in the anatomical literature. This difference can be explained by the design of the study. It was performed on clinical cases, and the “oblique branch” was only dissected when present during the harvest of an anterolateral thigh flap. It is not clear and not mentioned by the author whether the dissection of the remaining flaps was carried out in all clinical cases to a point where an “oblique branch” could have been detected. This would mean that the remaining 65 percent of the cases were not included in this study—and perhaps more proximally located transverse branches were simply missed.

The possibility of harvesting an anterolateral thigh flap based on an alternative pedicle is helpful, and the efficiency of this procedure has been proved by the authors. Nevertheless, the designation of a new branch of a well-described vascular system should be made on the basis of the international anatomical nomenclature and literature, and it should be made on the basis of an anatomical study rather than on clinical cases.

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REFERENCES


Reply

Sir:

We thank Drs. Hubmer and Feigl for their comments. We are well aware of the classic description of branches of the lateral circumflex femoral artery system. We agree that, based on these descriptions, the oblique branch could perhaps have been a low-lying transverse branch. In fact, that was our initial conclusion when we first noticed this vessel many years ago. However, with careful analysis and experience, it is quite clear that this vessel is not the transverse branch but a new vessel that we have called the oblique branch of the lateral circumflex femoral artery. As demonstrated in our article, from the standpoint of the use of the anterolateral thigh fasciocutaneous or myocutaneous flap, it is a vessel of profound clinical significance.

The description of a “new” branch of the lateral circumflex femoral system is a responsibility that we do not take lightly. Accordingly, we have performed cadaver dissections to meticulously study the lateral circumflex femoral system before performing the clinical series (Fig. 1). Having performed the anatomical study and with the benefit of an extensive experience with the anterolateral thigh flap, a prospective clinical study was performed. The benefits of a clinical study over a cadaver study are that in addition to noting its prevalence, the reliability of the oblique branch as the flap pedicle and adequacy for microsurgical anastomoses can be evaluated conclusively. We found in our study that the oblique branch is present in 35 percent of cases and originates most commonly from the descending or the transverse branch (88 percent). The transverse branch, in contrast, is always present and identified when we traced the flap pedicle to its origin at the lateral circumflex femoral artery (i.e., it is never missed as the authors erroneously suggested). Finally, one only has to note the occasional “extreme” cases encountered to be convinced that the oblique branch exists (Figs. 2 and 5).

Multiple types of the so-called anatomical variation of the anterolateral thigh flap have been described. Much of the past confusion regarding the surgical anatomy and failure of the anterolateral thigh flap could now be attributed to the unrecognized presence of the oblique branch of the lateral circumflex femoral artery. The description of the oblique branch is a certainly a step forward in our understanding of the surgical anatomy of the anterolateral thigh flap. To question its existence would take us back into the confusion that was so pervasive before. From a surgical standpoint,
knowing that either the descending or the oblique branch of the lateral circumflex femoral artery can be used as the flap pedicle is a psychological breakthrough and liberates one from the need to base the flap on the descending branch in every case. It encourages the move away from the conventional approach to flap harvest to one that embraces the free-style approach.6

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DISCLOSURE
Neither of the authors has a financial interest in any of the products, devices, or drugs mentioned in this reply or the article being discussed.

REFERENCES

Comparison of the Vascularity of Fasciocutaneous Tissue and Muscle for Coverage of Open Tibial Fractures

Sir:

We have read the article entitled “Comparison of the Vascularity of Fasciocutaneous Tissue and Muscle for Coverage of Open Tibial Fractures” by Lorraine Harry et al. published in Plastic and Reconstructive Surgery (2009;124:1211–1212). In that experimental study, the article by Calderon et al. entitled “Comparison of the Effect of Bacterial Inoculation in Musculocutaneous and Fasciocutaneous Flap” published in Plastic and Reconstructive Surgery (1986;77:785–754) is listed as a reference. This article was awarded first prize in the basic science category in the 1984 Plastic Surgery Educational Foundation contest, and it has been a reference in many others articles regarding these flaps.

Their study is well designed and the conclusions are valid. Since our study in 1986, we have operated on patients with open fracture with osteomyelitis using muscle, mainly rectus abdominis muscle free flaps in the distal third of the leg, with good results. In the open fractures without osteomyelitis and with extension no more than 5 cm in diameter, in the same area, we have published an article regarding use of the fasciocutaneous cone flap, Plastic and Reconstructive Surgery (2005;115:1582–1590), also with very good results. Thus, our clinical experience confirms the experimental study of Harry et al.

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Reply

Sir:

With reference to the letter from Dr. Calderón and Dr. Leniz, I am pleased to acknowledge Dr. Calderón’s contribution to this field of work, which has been extensively quoted, and which was included in my original publication as reference 16.

The article entitled “Comparison of the Effect of Bacterial Inoculation in Musculocutaneous and Fasciocutaneous Flaps” published in 1986 addressed a critical clinical problem, using a well-designed, novel canine model. This study enabled the microenvironment at the flap interface to be investigated, and the findings demonstrated that muscle had an increased ability to reduce the bacterial count at the wound surface and enhanced the indices of wound repair.

My coauthors and I attempted to refine the comparison of muscle and fasciocutaneous tissue with