

Perforator-guided drug injection at the point of nerve entrapment

Sven Weum^{1,2} MD PhD

Louis de Weerd^{1,3} MD PhD

¹Medical Imaging Research Group

Department of Clinical Medicine

UiT The Arctic University of Norway

9037 Tromsø, Norway

²Department of Radiology

³Department of Plastic Surgery

University Hospital of North Norway

9038 Tromsø, Norway

We highly appreciate the Letter to the Editor by Kini and Kanakarajan commenting on our article entitled “Perforator-guided drug injection in the treatment of abdominal wall pain” (1). In their paper published in 2011 the authors describe how they inject local anesthesia and corticosteroid in an area that “usually corresponds to the maximal tender point marked previously” (2). With ultrasound they visualize a “hyperechoic dot” within the muscle bulk approximately 0.5-1.0 cm medial to the linea semilunaris, which is interpreted as the cutaneous nerve.

As Kanakarajan et al. write, Kopell and Thompson have postulated that peripheral nerve entrapment occurs at anatomic sites where the nerve changes direction to enter a fibrous or osseofibrous tunnel or where the nerve passes over a fibrous or muscular band. Our experiences from abdominal wall reconstruction using component separation techniques as well as with breast reconstructions using the deep inferior epigastric artery perforator flap have made it clear for us that the most profound change in nerve direction occurs at the exit point through the anterior rectus abdominis fascia, not at the entry point into the rectus abdominis muscle. Of course, entrapment at the entry point is still possible and may cause anterior cutaneous nerve entrapment syndrome (ACNES). However, all our patients located the point of maximal pain over the exit point of the perforator through the anterior rectus fascia. None of our patients located the point of maximal pain at the linea semilunaris, making it unlikely that the entry point into the rectus muscle was the point of entrapment. In addition, several patients marked the point of maximal pain over the medial part of the rectus muscle.

Our technique was developed in 2008 and differs completely from the technique described by Kanakarajan et al. (2) in that we clearly can identify an anatomical structure with color Doppler ultrasound, namely the vascular perforator at the point of maximal pain. At this point, the sensory nerve makes an almost perpendicular change in direction from its intramuscular course towards the skin. Color Doppler ultrasound clearly visualizes the neurovascular bundle at the exit point and allows accurate deposition of the drug at the point of entrapment. As mentioned in our paper, in their anatomical dissections, Yap et al. found that

sensory nerves can travel with both medial and lateral perforators (3). Their histological examinations confirmed the presence of nerve tissue following the perforator vessels in 94 % of cadaveric and 93 % of clinical specimens. Further support for our approach can be found in the surgical treatment of ACNES, which is based on fasciotomy through the nerve foramen in the anterior rectus fascia (4).

Corresponding Author:

Sven Weum MD PhD

Medical Imaging Research Group

Department of Clinical Medicine

UiT The Arctic University of Norway

9037 Tromsø, Norway

Phone: +47 776 28311

E-mail: sven.weum@unn.no

REFERENCES

1. Weum S, de Weerd L. Perforator-Guided Drug Injection in the Treatment of Abdominal Wall Pain. *Pain Med.* 2016;**17**:1229-32.
2. Kanakarajan S, High K, Nagaraja R. Chronic abdominal wall pain and ultrasound-guided abdominal cutaneous nerve infiltration: a case series. *Pain Med.* 2011;**12**:382-6.
3. Yap LH, Whiten SC, Forster A, Stevenson JH. The anatomical and neurophysiological basis of the sensate free TRAM and DIEP flaps. *Br J Plast Surg.* 2002;**55**:35-45.

4. Lindsetmo RO, Stulberg J. Chronic abdominal wall pain--a diagnostic challenge for the surgeon. *Am J Surg.* 2009;**198**:129-34.