IDENTIFICATION OF ABDOMINAL CUTANEOUS PERFORATOR ARTERY IN PIG USING THE ANGIO-CT TECHNIQUE

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Abstract

Identification of vascularization of cutaneous skin flaps is an important step in reconstructive surgery, both in humans and veterinary medicine. Choosing the right cutaneous flap imply evaluation of its perforators vessels abundancy also reducing the morbidity of the donor and the receivers site. Cutaneous perforators represent a reliable source of vascularity allowing reconstruction of defects in plastic surgery base on the principle of reconstructive similarity. Materials and methods. The study was conducted on 5 pigs, PIC-F 11-337 hybrid, with a weight between 35-55kg. The pigs were subjected to sedation and anesthesia. The contrast agent used for Angio CT was VISIPAQUE 320 that was automatically injected using a CT 9000 ADV Contrast Delivery System. Scanning procedure was performed on SIEMENS SOMATOMSCOPE system. Results and discussions. After contrast agent injection, the scan was performed at 3 mm slice thickness, 110-130 kV and 25-66 mAs, and the reconstruction was made at 0.5 mm and 1 mm per slice. In the arterial time were identify the cutaneous perforators that irrigate the abdominal skin. Base on Angio CT images, the vessels identify with contrast agent were tried to by highlighted using surgical procedures. Conclusion. CT Angiography is a technique that help chart the cutaneous perforator, being an imaging technique that have a real potential in establishing the proper cutaneous flap in case of plastic surgery.

Keywords: cutaneous perforators, CT Angiography, pig, skin flaps

Introduction

Identification of cutaneous perforator artery play a significant role in plastic surgery, helping the surgeon to identify the proper perforator flap. A perforator flap is represented by a flap of skin or subcutaneous tissues obtained by dissection of a perforating vessel that have its origin in one of the axial vessel of the body (Taylor, 2003; Lyons, 2006). Properly identifying the supply vessel of the cutaneous flap help reduce the morbidity of the donor site (Karki and Narayan, 2012).

Materials and methods

The study was conducted on 5 pigs, PIC-F 11-337 hybrid, with a weight between 35-55kg. Preoperative anesthesia was performed using Sulphuric Athorpine 0.04 mg/kg SC, Azaperone 2 mg/kg IM (Stresnil - Janssen Pharmaceutica, Belgium), Diasepam 0.1 mg/kg IM and Ketamine 10 mg/kg IM (Vetased - SC Pasteur Filiala Filipești SRl, România). The induction was realized using Propofol 1%, "Fresenius" (Fresenius Kabi Deutschland GmbH, Germany).

The contrast agent used for Angio CT was VISIPAQUE 320 that was automatically injected using a CT 9000 ADV Contrast Delivery System.

Scanning procedure was performed on SIEMENS SOMATOMSCOPE system. The scans were performed using thorax and abdomen as a target area. Spiral acquisition were obtained, exposure time for CT angiography was 28.4±3.6 s, Scanning Length: 434.8±18.7 mm, Nominal Total Collimation Width: 9.6 mm, Pitch Factor: 1.5 ratio, Number of X-Ray Sources: 1 X-Ray sources. CT X-Ray Source Parameters were: 110-130 kV, Mean X-Ray Tube Current: 25-66 mA, Exposure Time per Rotation: 1 s. CT dose was 3.21 mGy.

Results and discussion

The contrast substance was injected automatically in doses between 0.5-3 ml/Kg I.V, at a flow of 2 ml substance/second and an injection pressure of 122 psi (fig. 1).
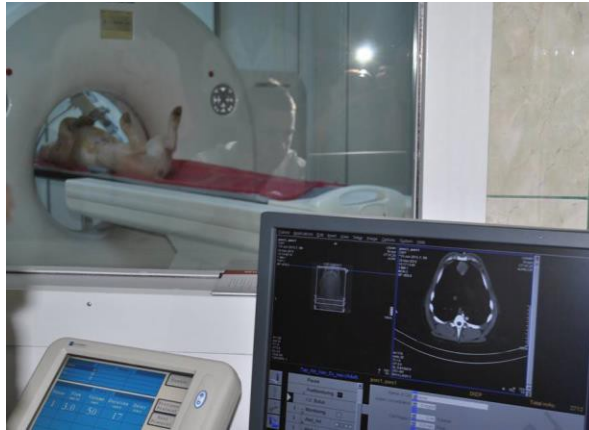

Fig. 1 CT examination in pig

Coronal examination of thoracic and abdominal, after contrast substance administration, during arterial time, highlight the perforant arteries that emerge from the superior epigrastric artery and the inferior epigastric artery (fig. 2, fig. 3).
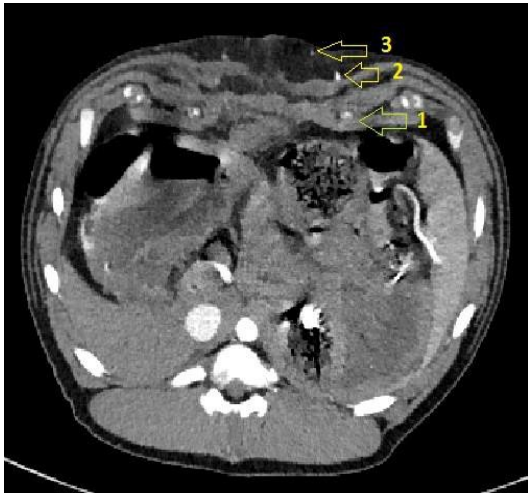

Fig. 2 Coronal view of the superior abdomen in pig: 1 superior epigastric artery; 2 and 3 branches of perforate artery

Fig. 3 Coronal view of the inferior abdomen in pig: 1 inferior epigastric artery; 2 branches of perforate artery

On sagital and axial plane, in the arterial time, roots of the cutaneous perforant arteries could be highlighted (fig. 4, fig. 5, fig. 6).

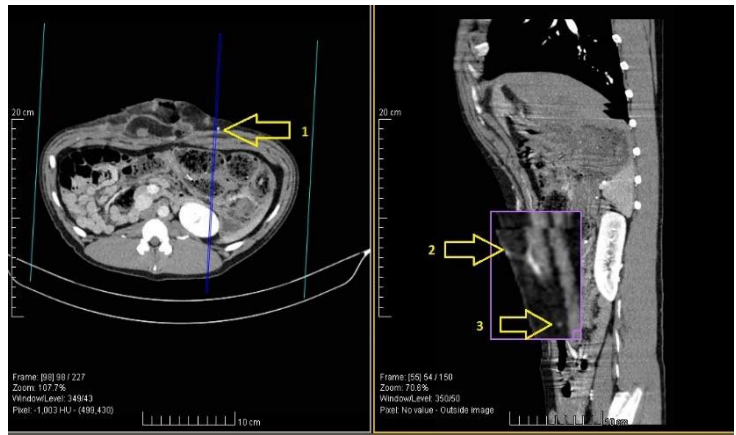Fig. 4 Sagital view of the abdomen in pig: 1 superior epigastric artery; 2 branches of perforate artery

Fig. 5 Coronal and Sagital view of the abdomen in pig: 1 superior epigastric artery; 2 and 3 branches of perforate artery
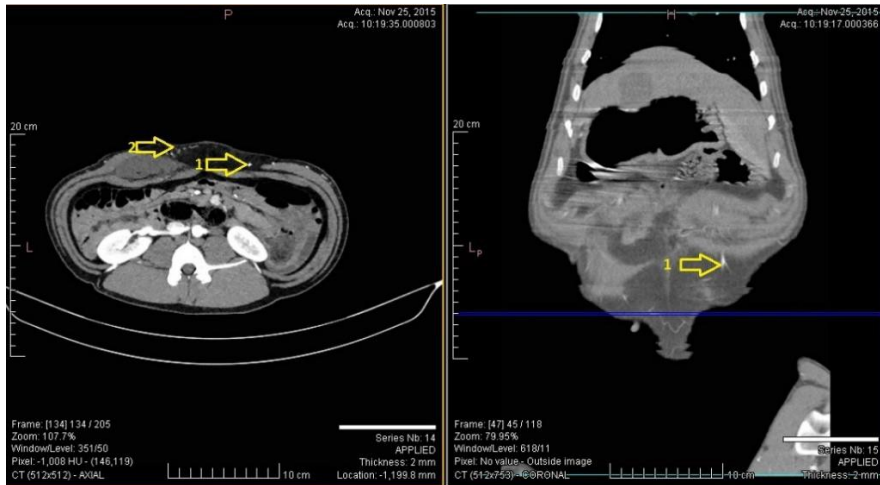

Fig. 6 Coronal and Axial view of the abdomen in pig: 1 superior epigastric artery; 2 branches of perforate artery

Conclusion

Angiography using Computed Tomography technique is an valuable asset in plastic surgery, helping the physician to quickly identify the proper area from were a schin flap could be taken without destroying the main vessels and preventing the morbidity of the donor site.

References

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