Abstract. By this study we tried to create an experimental model for pigs, in skin grafts at humans, by improving the detection technique of the main perforating vascular branches in the entire body surface and making a vascular map of these segments with the help of the medical imagistic.

Key words: coetaneous peel, skin grafts, pig.

INTRODUCTION

The perforating blood vessel represents a secure source of vascular irrigation which offers a large opening to the collecting areas of the coetaneous peel, allowing a reconstruction of the defects from clinical practice respecting accurately the similitude reconstructive principle “like with like”.

Their usage as free microsurgical coetaneous peel has known at first a high interest, creating the describing premises and the utilization of coetaneous peel based on perforating vessel from the profound inferior epigastrical artery, the superior gluteal artery, the dorsal thoracic artery, the descendant branch of the lateral circumflex femoral artery and more rarely from the radial artery and the medial circumflex femoral artery.

From the desire to assure a higher reconstructive similitude but also to reduce the morbidity of the donating area and receptive area, as well as the prolonged operating timing in cases of free coetaneous peel, the surgeon’s preoccupation to develop and improve the applicability of the local coetaneous peel or regional based on the perforating vessels.

MATERIALS AND METHODS

The investigations were made in the Radiology and Veterinary Imagistic Laboratory from the Faculty of Veterinary Medicine, Cluj-Napoca, in the Radiology and Imagistic Laboratory from the Recovery Clinical Hospital, Cluj-Napoca, in collaboration with the Surgery Clinic from the Faculty of Veterinary Medicine, Cluj.

The biologic material used in this research was represented by a lot formed by 10 pigs from PIC F II breed (6 females and 4 males) with body masses ranging between 35 kg and 50 kg.

Selecting the type of the pig: Taking into consideration the morphological aspects of the pig’s breeds in achieving the established objectives, and that being detecting the main perforating vascular branches in the entire body surface at pig, we have chosen for this study the meat hybrid PIC-F II-337 (terminal boar). We have chosen this type of hybrid because of the following:

- The fat layer is very small.
The good capacity of adapting to new environmental conditions met during this research;

The high resistance to diseases and pests.

**The ecographic exam** was made with the help of a performant ecographer of last generation 2008 GE Logiq 9, with translators of high linear resolution with variable frequency 9 - 14Mhz and also with a GE Voluson 730 Expert Pro ecographer with linear translator with variable frequency 10 – 14 Mhz. There have been scanings on each of the quadrant with the identification od coetaneous perforating vessels. (fig. 1, fig. 2, fig. 3).

![Fig. 1 The cartography of the body surface](image1)

![Fig. 2 The evidence of cutaneous perforating vessels using pulsative Doppler technique](image2)

![Fig. 3 The evidence of cutaneous perforating vessels using coloured Doppler technique](image3)

**The angiographic exam** of the pigs was done with the help of the SIEMENS Angiograph Coroskop Top model C-arm with a digital capture mode of the images (DAS – Digital Acquisition System), with the possibility of zooming the image, digital video capture (DCM - Digital Cine Mode) and serigraphic and also a radio diagnostic machine Philips Duodagnost with a digital system of capturing the images by impregnation on phosphoric plaques and a detector type PCR Eleva S. The contrast substances nonionics used were: ULTRAVIST, OPTIRAY, VISIPAQUE, in different concentrations.

For the pre surgical angiographic exploration the pigs were sedated by intramuscular or intravenous anesthesia (neurolept – analgesia) with Narcoxy 2 (xilazin hydrochloride 20mg/ml), Stresnil (azaperonă 40mg/ml) and Ketaminol 10 (ketamin hydrochloride 100 mg/ml) for veterinary use.

For the long surgical interventions we used the inhalator narcosis by endotracheal intubations in closed circuit, using the Isoflurane narcotic.
RESULTS AND DISCUSSIONS

For each topographic region taken into study, the pig was differently positioned to be able to visualize tangentially the small vessels that go towards the tegument. In the moment in which the contrast substance has given opaqueness to the superficial arterial vessels of the region, the mobile arm of the angiograph was rotated so as to allow the examination in a tangential plan of the interest area. Under radioscopic control a iodine, non-ionic contrast
substance was injected in a continuous rate in the right femoral artery in the direction of the blood flow. A VISIPAQUE 320 mg I/ml, injection solution was used, with 0.6411 Osm/kg osmolarity, 66.1 to 37 Celsius grade viscosity. Active substance Iodixanol (INN) 320 mg/l/ml 625 mg equivalent to 320 mg I. The Iodixanolul is a contrast medium for X-rays, non-ionic, dymeric, hexaiodine, hydrasoluble and OPTIRAY 320, injection solution with 678 mg/ml corresponding ioversol to 320 mg/ml iodine.

Fig. 7 The angiography in the right front member and the identification of the perforate arteries by anatomic dissection

Fig. 8 The angiography in the left back member and the identification of the perforate arteries by anatomic dissection

Fig. 9 The angiography in the lumbar arteries and the identification of the perforate arteries by anatomic dissection
CONCLUSIONS

Based on the obtained data we can conclude the following:

In the cartography and identification of the muscle-coetaneous perforate vessels or fascio coetaneous vessels in pigs a determinate role holds the imagistique techniques and nonionic substances.

Among the uncontestable advantages of the coetaneous peel on the perforate vessels are: the multitude of donating areas, higher liberty in the drawing and sampling of the coetaneous peel, intact keeping of the major vascular axes (especially in the local coetaneous peel cases and regional); higher security in the conditions of a correct surgical technique.

The main artery sources that form the basis of these coetaneous peel are the axial arteries of the members, the gluteal arteries (superior and inferior), the dorsal thoracic artery, the intercostals arteries.

The arterial graphic was used in the pre surgical determination of the perforate vessels with some limitation like the exploration of the vessels from a distance with a nozzle, because in a local cannulation of these vessels pre operator would be out of the question the possibility of sampling a coetaneous peel on that perforate artery (it’s destroyed by catheter).

The arterial graphics made after surgery were useless in determining the vascular system from the coetaneous peel region proving it’s extension in caliber as a result of coetaneous peel sampling. These can be used only in experimental purposes, because they irreversibly compromise the coetaneous peel by it’s full take-off and complete sampling.

Fig. 10 Lambou re sutured with the perforate artery marked in the central

Fig. 11 The post operating monitoring of the lambous— at 2 days post operation, at 2 weeks post operation, respectively at 4 weeks post operation
The arterial graphic is an invasive method, pretty vague in establishing the place and quality of the perforate vessels. It has also other disadvantages: it detects only the big caliber vessels, it’s harder to accept and support by the patients, the possibility that by introducing in the artery the radio opaque substance will influence the post surgical evolution of the coetaneous peel; limiting the number of injections and the maximum substance dose did not allow the examination of each topographic region in more than 2 -3 incidents, at every reiteration under different angle of examining being necessary a new contrast substance injection.

The using of this kind of coetaneous peel has also some disadvantages, among which: the intra specific variability of the perforate vessels makes it necessary for a pre surgical detection method that can be used as a pedicle to the planned coetaneous peel; a high susceptibility at the venous suffering (congestion) with a risk of partial necrosis of the coetaneous peel by a deficit of venous comeback flow, which represents the most important disadvantage of the coetaneous peel on the perforate vessels.

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REFERENCES