- Maecken T, Thomas MD. Ultrasound imaging in vascular access. Critical Care Med: 2007; 35:

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The Femoral approach

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Vascular access with femoral catheter is one of the most commonly used temporary accesses in haemodialysis.

The placement of a femoral catheter for haemodialysis is indicated when there is an urgent and temporary need for treatment, when other approaches cannot be used (for example jugular catheter), when no radiological control is available, or when the patient's situation means that he or she cannot be placed in prone position (for example, patients with acute lung oedema or with a compromised thoracic situation). The placement of a femoral catheter is, therefore, adequate in situations of acute renal insufficiency that require continuous or intermittent haemodialysis techniques, or in patients with chronic renal insufficiency without vascular access (failure of the fistula, transplanted patients or with peritoneal dialysis) in critical situation. This access is also indicated in patients who immediately require light chains in the myeloma in the plasmapheresis or in the dialysis. It is considered that the femoral catheter must not be maintained for more than one week because the risk of infection is high due to its location.

There are very few counter-indications for the femoral catheter: active infection in the skin of the femoral area, and thrombosis of the inferior vena cava, iliac artery or femoral artery.

The catheter to be used must be longer than 20 cm (the most commonly used measures 24 cm), and in the majority of the cases, it will have to be dual-lumen. Femoral approach technique. The asepsis measures recommended for all central catheters must be used (sterile field, surgical hand wash, mask, gown and sterile gloves).

The patient must be placed correctly and a precise anatomical knowledge of the puncture area is essential in femoral approach. The patient is firstly placed in supine position with the lower extremity in abduction and external rotation. The femoral artery is located by feeling its pulse at the union of the middle third and two side thirds of the inguinal ligament (figure 1). The femoral vein is situated medially to the femoral artery and is channelled at 1-1.5 cm medial to the place where the pulse is felt and 2-3 cm below the inguinal ligament (figure 2).

We use the Seldinger technique to channel the femoral vein and place the catheter. The following complications may arise in the femoral vein approach:

- Pierce both walls of the vein. When the vein is punctured, it may collapse and be pierced; to locate the lumen of the femoral vein, the needle must be removed slowly, suctioning with the piston of the syringe, until we return to the lumen of the vessel.
- Difficulty to enter the guide. This complication may be due to several causes. At times, the guide does not enter the vein because, when the syringe is removed, the needle moves outside the lumen. It is also possible, when inserting the guide, for this to channel a collateral one, thus making its free movement difficult. Inserting the guide into the lumbar vein is frequent.
- Channelling of the femoral artery. If we insert the needle into the artery, the blood gushes out pulsating and its colour is a lighter red. If this occurs, we must compress the puncture area for several minutes before trying the approach again.
- Haematomas. One of the most frequent complications is the formation of a visible haematoma on the skin of the puncture area. Important retroperitoneal haematomas have also been described, which we must bear in mind in a situation of haemodynamic instability of the patient following the femoral artery approach.

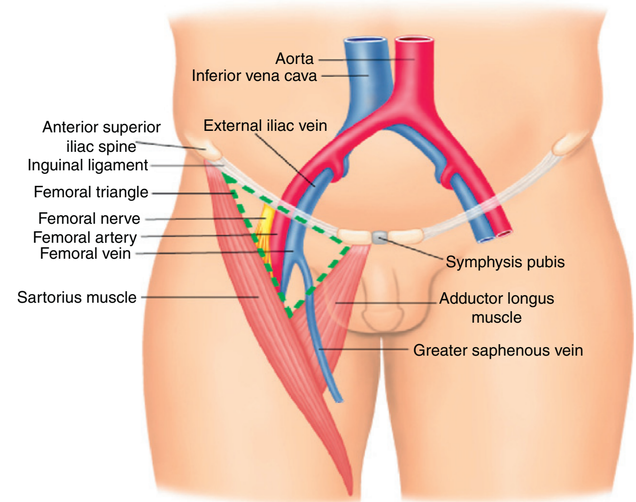

Figure 1 Anatomic memory.

Figure 2 Location of the femoral vein.

- Arteriovenous fistula. This is an infrequent complication that sometimes occurs when we perforate the femoral vein and artery. It is clinically expressed with pain and inflammation and a murmur is heard in the area. Its treatment is surgical.

Over the last few years, the need for ultrasound monitoring in cannulation of central veins has been discussed. In the case of jugular approach, there are studies that prove its efficacy. However, the use of ultrasound monitoring in femoral puncture has hardly been studied, perhaps due to its ease and the lack of serious complications of this access. In the few studies performed, a discrete reduction in failures as well as a reduction in the number of punctures and complications has been found. Thus, a reasonable attitude would be to use ultrasound monitoring whenever we have it or at least in those more complicated situations: obese patients, with weak pulse due to low blood pressure, with important coagulation alterations, with anatomic alterations in the area due to operation, etc.

More and more articles are also appearing in literature about the usefulness of tunnelled femoral catheters. Their usefulness has been described in patients with acute renal failure to reduce morbidity and increase the efficacy of dialysis and in patients with Chronic Renal Disease (CRD) with thrombosis of the superior vena cava or when all other possibilities have been exhausted. The tunnelled femoral catheter placement technique is similar to that described above, except that a subcutaneous trajectory is added. The catheters are longer than the jugular tunnelled catheters and than the temporary femoral ones. Fluoroscopic control is advised. The raised tunnel femoral catheter usually has a lower survival rate than jugular catheter due to infection or thrombosis.

In short, femoral access is an interesting alternative providing that its use is considered for a short period of time. Its main advantages are that it is easy and quick to place and that no radiological control is required and the patient does not have to lie down. Furthermore, there are few complications and if they do appear they are normally not very severe.

Further reading

- Tsui JY, Collins AB, White DW, Lai J, and Tabas JA. Videos in Clinical Medicine. Placement of a Femoral Venous Catheter. N Engl J Med 2008; 358:e30.
- Pervez, A., Abreo, K. Techniques and tips for quick and safe temporary catheter placement. Seminars in Dialysis, 2007; 20(6):621-625.
- Ball A, LoVecchio F, Kroeger A, Stapcznski J.S., Mulrow M, Drachman D. Ultrasound guidance for central venous catheter placement: results from the central line emergency access registry database. Am J Emerg. Med 2010, 28:561-567.
- Prabhu MV, Juneja D, Gopal P, Sathyanarayanan M, Subhramanyam S, Gandhe S and Nayak S. Ultrasound-guided femoral dialysis access placement: a single-center randomized trial. Clin J Am Soc Nephrol 2010, 5:235-239
- Hind D, Calvert N, Williams A, Paisley S, Beberley C, Thomas S. Ultrasonic locating devices for central venous cannulation: meta-analysis. BMJ 2003, 327:1-7.
- Parienti JJ, Megarbane B, Fischer MO, et al for members of the Cathedia Study Group. Catheter dysfunction and dialysis performance according to vascular access among 736 critically ill adults requiring renal replacement therapy: a randomized controlled study. Crit Care Med 2010; 38:1118-1125.
- Parienti JJ, Thirion M, Megarbane B, Soubeine B, et al for members of the Cathedia Study Group. Femoral vs jugular venous catheterization and risk of nosocomial events in adults requiring acute replacement therapy. JAMA. 2008; 299(29):2413-2422.
- Klouche K, Amigues L, Deleze S, Beraud JJ, Canaud B. Am J Kidney Dis 2007; 49(1):99-108
- Brudruddin M, Mohsin N, Amitabh J, Ehab M, Abbas P, Khalil M, Lawati S.Femoral vein tunnelled catheter at last resort to vascular access: report of five cases and review of literature. Renal Failure 2009;31:320-322.
- Bertoli S, Ciurlino D, Musetti Cl, Mazullo T, Villa M, Traversi L, Tedoldi S, Procaccio M. Experience of 70-cm-long femoral tunnelled twin Tesio catheters for chronic hemodialysis. Nephrol Dial Transplant 2010; 25:1584-1588.

http://dx.doi.org/10.1016/j.dialis.2012.06.006

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History of vascular access for haemodialysis

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The History of Vascular Access for Haemodialysis is different to that of other technological developments and discoveries. What normally occurs in R&D is that a need stimulates inventiveness and after some initial developments, the involvement of Industry produces an exponential growth in the R&D, which ends up solving (often partially) the problem. After this development phase, the research declines, unless a genius develops a new channel or approach to the initial problem. In this new phase it is more difficult to involve Industry, as the initial solutions have already solved the problem.

In the case of Vascular Access for HD, decades went by from the first HD on a human being (Haas G, 1924) and the first survival (Kolff W, 1944) until it was possible to permanently maintain a patient in chronic HD (Clyde Shields, from 1960 to 1970). And this delay was derived from the lack of an adequate Vascular Access.

Only six years later (Cimino & Brescia, 1966) the VA Fistula was described, which, since then, has not been surpassed by any other type of access. The problem, from my viewpoint as a nephrologist and researcher is that since 1966 we have accepted that the problem of Access for HD is ''adequately solved'' and we have not proposed any new channels in R&D to solve the serious problems that are continuously posed by Vascular Access in our patients in Dialysis. Not only have we accepted that the problem is no longer pressing, but we have delegated it upon other specialists (vascular surgeons and radiologists, mainly), who are technically better qualified but who do not perceive the problem of the lack of adequate vascular access in our HD Units. If the cardiologists were to have delegated haemodynamics and