

Vascular access in children.

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A prospective study on haemodialysis arteriovenous access creation in children was done.

Materials and Methods

Between January 2000 and December 2004, 127 children, mean age: 8.1 years (range 0.6 to 15), mean weight: 26 kg (range: 6 to 70) had consecutive arteriovenous access creations.

Pre-operative vessel mapping was performed using ultrasound or venography . Prophylactic hemostasis and microsurgery were systematically used for fistula construction (Figure 1).

Post-operative stenoses and thromboses were treated either by surgery or interventional radiology.

All the AVF (n=131) were autologous fistulae: 100 radiocephalic, 3 ulnobasilic, 19 brachiobasilic, 7 brachiocephalic, 2 femoral vein superficialisation (Figure 2).

A sufficient maturation was observed in 121 AVF, of which 103 are already on use for haemodialysis or have been on use until irreversible thrombosis, kidney transplantation (n=102), lost to follow-up (n=2) or death (n=5).

Results

For radiocephalic fistulae (Figure 3), immediate failure rate was 3%, primary and secondary patency rates were 63% and 95% at 1 year, respectively.

For brachiobasilic fistulae (Figure 3), immediate failure rate was 5%, primary and secondary patency rates were 44% and 84% at 1 year, respectively.

Twenty seven of these children (girls: 11) were under 4 years old, mean age: 2,3 years, mean weight: 10 kg (range: 7 to 15). Fifteen children were already on dialysis (mean duration: 284 days, range 70 to 29): 9 had central venous lines sometimes complicated by same side proximal vein stenosis (n=2) and thrombosis (n=2), 6 were on PD. Once again all the AVF were autologous fistulae: 15 radiocephalic, 6 brachiobasilic, 5 brachiocephalic, 1 femoral vein superficialisation . Four non-matured fistulae were observed: 1 child died after 1 month, 1 distal AVF thrombosis necessitated the creation of a brachiobasilic AVF, 2 AVFs have been created too recently (< 3 months). Among the 23 functioning AVF, 6 are not on use: 1 renal function recovered, 2 children are maintained on PD, 3 children had successful pre-emptive

transplantations. The remaining 17 AVF are or have been on use until kidney transplantations (19: all successful but one) or deaths (3). Mean delay between creation and maturation was 92 days (SD= 120). Complications are listed on Table 1. Mean flow measurement was 1.375 ml/mn/1.73m² (SD= 553).

Conclusion

Microsurgery is a prerequisite for creation of angioaccess in children¹⁻². Even in young children under 4 years the results of microsurgical creation of AVF may be considered as excellent.

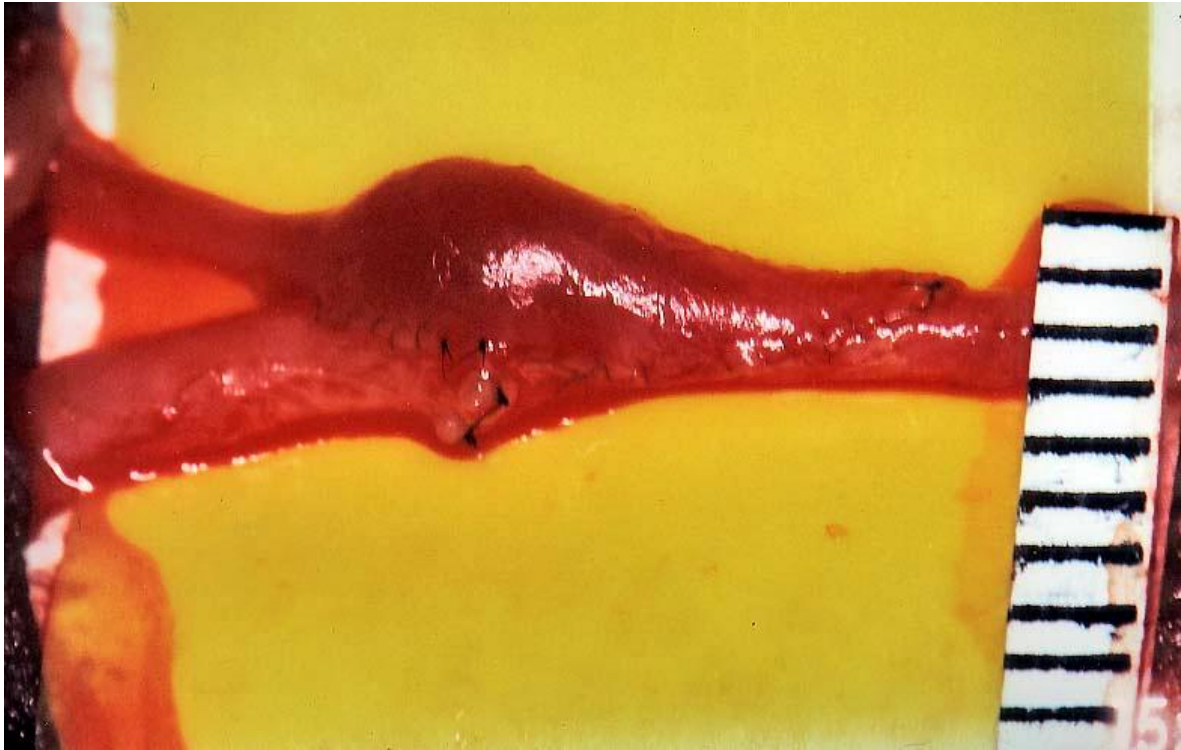


Fig. 1 Completed microsurgical radiocephalic anastomosis in an infant.

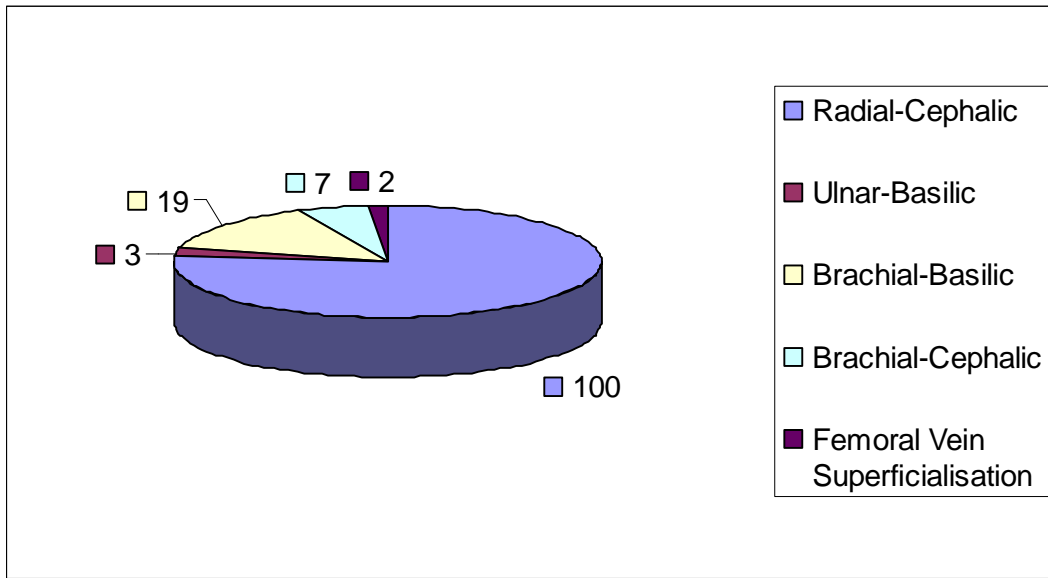


Figure 2 Distal and proximal arteriovenous fistulae.

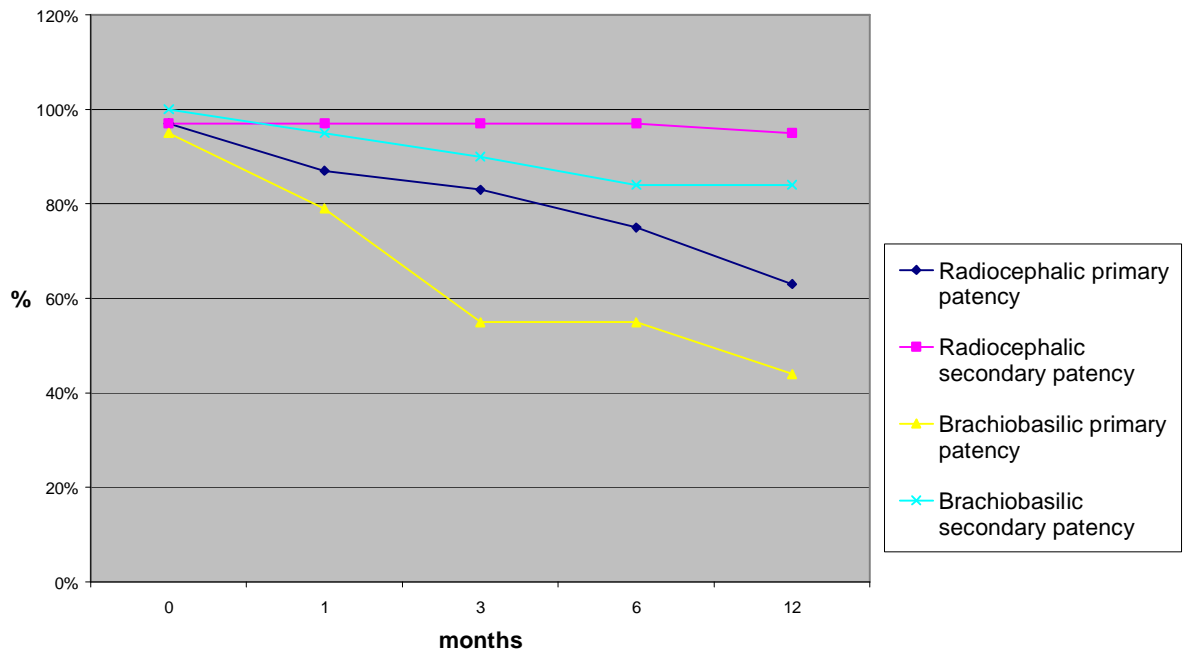


Figure 3 Actuarial survival of radiocephalic and brachiobasilic fistulae in children

	Radial Cephalic	Brachial Cephalic	Brachial Basilic	Femoral Superfic.I
N AVF	15	5	6	1
Technical failure	1			
Anastomosis redo	1			
Superficialisation	2		5 (+ 1 preop.death)	
Post-op. hematoma		1		1
PTA	4	1	3 (2 in 1 pt.)	1
Flow reduction	2 (PRAL*)		1 (RAT**)	
* : <i>juxta-anastomosis proximal radial artery ligation</i> ** : <i>radial artery transposition</i>				

Table 1. Complications of first AVF in children under 4 years

References

1 Bourquelot P. Vascular access in children: The importance of microsurgery for creation of autologous arteriovenous fistulae Eur J Vasc Endovasc Surg 2006;32:696-700

2 Bourquelot P. Vascular access in children . In : *Vascular access simplified*. Davies AH, Gibbons CP, Eds. UK : tfm Publishing Ltd, 2007 : 211-223