ARTERIO-VENOUS FISTULA IN SMALL CHILDREN

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From 1970 until 11/1977, 129 internal blood access sites were created in 66 children under 20 kg (8-19. 5 kg; mean 15 kg), 20 months to 12 years old (group I). The results were compared with those of 116 fistulae performed in 75 children over 20 kg (group II) within the same period.

Methods

Three patterns of internal blood access were used:
- end-to-end distal fistula (DF) between the radial artery and the cephalic vein above the wrist.
- end-to-side proximal fistula (PF) between the brachial artery and the cephalic, or, if not available, the basilic vein above the antecubital fossa.
- vascular graft (VG) with saphenous (auto-or homologous), bovine carotid or polytetrafluoroethylene (PTFE) interposition, looped at forearm or straight in the upper arm.

Immediate success rate was defined as the percentage of immediately functioning fistulae. Survival rates (± SE) were calculated by the life-table method.

Results

I) The immediate success rate is not significantly lower in group I than in group II. In small children, the success rate of DF is significantly lower (p<0.05) than that of PF and VG.

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<tr>
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<th>group I</th>
<th>group II</th>
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<tbody>
<tr>
<td>Total</td>
<td>64% (n = 129)</td>
<td>72% (n = 116) NS</td>
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<tr>
<td>DF</td>
<td>54% (n = 66)</td>
<td>70% (n = 77)  NS</td>
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<tr>
<td>PF</td>
<td>72% (n = 36)</td>
<td>69.5% (n = 23) NS</td>
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<tr>
<td>VG</td>
<td>78% (n = 27)</td>
<td>87.5% (n = 16) NS</td>
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II) *The survival rates* do not differ significantly between the 2 groups.

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<tr>
<td>1 year</td>
<td>71.9 ± 5.8%</td>
<td>77.8 ± 5.2% NS</td>
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<tr>
<td>2 years</td>
<td>56 ± 8%</td>
<td>71.5 ± 6.6% NS</td>
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In small children (group I) the survival rates were similar in DF and PF (respectively 83.9 ± 6.7% and 77.4 ± 10.4% at 1 year) but much lower in vascular grafts (40.7% ± 14.3%).

III) *The 66 small children of group I* were dialysed during 77 patient-years.  
1) The fistula was distal in 43%, proximal in 29%, and was a vascular graft in the remaining 28%
2) *The mean time* between the creation of the internal fistula and the first puncture was 55 days (minimum 7 days, maximum 10 months). It was longer in DF (mean 71 days) than in VG (mean 37) and PF (mean 49).
3) *The mean blood flow rate* during dialysis was 122 ± 26.5 ml/min. It correlates significantly (p<0.001) with the body weight, according to the equation:

\[
\text{flow} : 1.78 \times \text{weight} + 95.9
\]

(ml/min) (kg)

4) *Complications* were unusual (3 infections, 3 false aneurysms, 2 haemorrhages) and never life-threatening. *Cardiac failure was not observed.* Emotional stress at venepuncture seemed intolerable in only one case.
5) Five of these fistulae in children from 5 to 8 years old (13-17 kg) were used at home by parents without any difficulty for 1 - 3 years.

**Conclusion**

An available blood access (direct fistula, and, in case of failure, vascular graft) can be created in every child from 7-8 kg (and perhaps less) and allows long term haemodialysis in small children as well as in adults with good physical and psychological tolerance.