Publication Brief

Predicting Arteriovenous Fistula Maturation with Intraoperative Blood Flow Measurements

Objective
To establish criteria for intraoperative blood flow measurements during fistula construction to predict future access maturation and avoid waiting periods for futile fistulas to declare themselves.

Study
- 70 autologous fistulas were created in 35 females and 33 males during one year.
- Successful fistulas maturation required that the fistula could be dialyzed at least three times.

Results
- Maximal flow rates seen in functional versus non-functional fistulas differed significantly.
- Flow rates for maturation in radiocephalic versus brachiocephalic fistulas also significantly differed.
- No difference between groups in regard to age, gender, race or etiology of renal failure.
- Thresholds to predict maturation to a functional access were 140 mL/min for radiocephalic and 308 mL/min for brachiocephalic AVFs.

Conclusions
Fistulas that are unlikely to mature and require immediate revision or abandonment can be identified by intraoperative blood flow measurements at the time of fistula construction. This expedites establishment of a useful access in the hemodialysis patient. Time is not wasted on a fistula unlikely to mature.

Take Home Points
- Vascular access surgeons experience increasing pressure to create AV fistulas.
- A critically missing piece of information are well-defined expected success rates for new AV fistulas.
- Twenty to thirty percent of all AV fistulas fail to mature to be functional accesses for dialysis. When a fistula can not be used, valuable time is loss.
- The study sets 140 mL/min as the minimal flow to predict maturation of a radiocephalic fistula; 308 mL/min to predict maturation of a brachiocephalic fistula to a functional access.
- The study corroborates other studies that demonstrate that measuring blood flow intraoperatively at the time of fistula creation provides valuable information to predict fistula maturation (see table above).²,³,⁴,⁵

References
5 Ross J, unpublished data.

Comparison of thresholds of four studies to predict maturation of AV Fistulas.

<table>
<thead>
<tr>
<th>AV Fistulas</th>
<th>Berman 2008²</th>
<th>Johnson 1998¹</th>
<th>Won 2000³</th>
<th>Lin 2008⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio-cephalic</td>
<td>&gt; 140 (n = 21)</td>
<td>&gt; 170 (n = 94)</td>
<td>&gt; 160 (n = 50)</td>
<td>&gt; 200 (n = 109)</td>
</tr>
<tr>
<td>Brachio-cephalic</td>
<td>&gt; 308 (n = 49)</td>
<td>&gt; 280 (n = 128)</td>
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