BRACHIOCEPHALIC AND RADIOCEPHALIC FISTULA

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Upper limb
Haemodialysis access

- Access placed as distal as possible

- Order of access

  - Snuff box fistula
  - Brescia-Cimino fistula
  - Mid forearm cephalic fistula
  - Antecubital fistula
  - Transposed basilic fistula

> 2.0 cm
RCF

REFERRED AS PRIMARY ACCESS
RADIOCEPHALIC FISTULA

ADVANTAGES

• RELATIVELY EASY TO CREATE

• PRESERVES MORE PROXIMAL VESSELS FOR FUTURE USE

• FEWER COMPLICATIONS

• LOWER ISCHAEMIC STEAL SYNDROME

• LOWER INFECTION AND THROMBOSIS RATE
RADIOCEPHALIC FISTULA

- DISADVANTAGES
  - LOWER BLOOD FLOW
  - HIGH PRIMARY FAILURE RATE (19.3%)
<table>
<thead>
<tr>
<th></th>
<th>Radiocephalic</th>
<th>Brachiocephalic</th>
<th>Brachiobasilic</th>
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<tr>
<td><strong>Primary failure (%)</strong></td>
<td>19.3 (10.8-66.0)</td>
<td>20.4 (4.0-41.1)</td>
<td>25.2 (0-32.4)</td>
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<td><strong>1yr (%)</strong></td>
<td>67.3 (48-63)</td>
<td>80.0 (70-91)</td>
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<td>56.6 (50-63)</td>
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<td>57.3 (45-70)</td>
<td>70.7 (50-78)</td>
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**Patency Rates**

LOk et al seminars in dialysis 2003;16: 189-96
**BCF**

- **Often referred as a “secondary access”**

- **Emphasises RCF as first line fistula**
Brachiocephalic

**Advantages**

- **Lower early failure rate**
- **Higher blood flow**
- **Age, female gender and DM does not affect delay in maturity**
- **Ease of cannulation**
- **Cosmetic advantage**

K-DOQI CPG for Vascular Access am J Kid Dis 2001
Brachiocephalic Fistula

- Disadvantage

- Ischaemic steal syndrome
Brachiocephalic

The reality

Small veins over forearm

Most often punctured and disease
AVFs in HKL-2009 (n=702)

- RCF: 34%
- BCF: 50%
- Others: 14%
- BBF: 2%
- Snuff box: 0%
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Superficial venous anatomy at the antecubital fossa (left arm)

- Cephalic vein
- Accessory cephalic vein
- Perforating vein
- Median cubital vein
- Basilic vein
- Cephalic vein
- Baslic vein
- Median basilic vein
- Median cephalic vein
- Median cubital vein
Recipe for success

Assessment with case selection

Surgery

Surveillance

Fistula salvage
Assessment

History

Examination

Venopuncture marks

Skin integrity

Radial and ulnar pulses
ASSessment

- Non-invasive

- Ultrasound duplex

  - Diameter and patency of veins

  - Size and quality of artery

  - Distance between vein and artery

- Photoplethysmograph
**Duplex ultrasound**

- Routine in all patients

- 63% increase in fistula creation vs 14% in absence of duplex scanning
PRE-OP ASSESSMENT

DUPLEX

- Size (2.0-2.5mm)

- <1.6mm: 16% vs >1.6mm: 76%

- Reality

- Thickened wall

- Recent puncture

- Outflow
Pre-requisites of Surgical Loupes and Instruments
Instruments
Instruments
SURGERY

- **Radiocephalic Fistula**
- **End to Side Anastomosis**
- **Highest Fistula Flow**
- **High Patency Rate**
- **Minimal Venous Hypertension**

*Figure 11-3.*
Four different anastomoses commonly constructed between the radial artery and the cephalic vein.
RADIOCEPHALIC
FISTULA
Brachiocephalic Fistula
Complications
Male patients who have relatively small arteries, a high-flow fistula or graft can exceed the capacity of the feeding arterial system, even in the absence of arterial inflow disease.

Prevalence Steal syndrome will develop in 2% to 20% of patients with AV fistulas or grafts. Most recent retrospective studies show operative intervention for steal in about 4% of patients after vascular access surgery. Prospective studies typically diagnose symptomatic steal in 15% to 20% of patients. The difference likely represents bias from the study design, in that follow-up interviews with patients are more likely to elicit ischemic symptoms. Despite advances in preoperative evaluation and surgical techniques, this incidence has been largely unchanged for the last 20 years. Chronic hemodialysis patients remain at risk for ischemic complications in the absence of an AV fistula.

Recent work continues to show early and late presentation of symptoms of steal. AV grafts typically develop steal immediately following surgery. Ischemia caused by autologous fistulas presents later as the vein matures and dilates, allowing increased blood flow. Lazarides et al report the median time to recognition of symptoms as 2 days in AV graft group compared to 165 days for autologous fistulas.

### Diagnosis

Steal syndrome remains a clinical diagnosis based on paraesthesias, pain, and ulceration and tissue loss. Common complaints are parasthesias, pain, and hand stiffness. Physical exam will show pallor, diminished sensation, and, ultimately, ulceration and gangrene. The radial pulse is usually absent; although in some patients, ischemia of fingers may be present with a palpable radial pulse. Compression of the shunt often relieves symptoms temporarily and augments the distal pulse. Increased heart rate and blood volume or symptoms of congestive heart failure are not usually caused by the AV fistula in hemodialysis patients, probably because of the blood-volume adjustment that occurs at each dialysis.

Sidawy et al, present a useful summary for describing ischemia reflecting the spectrum of symptoms that are helpful in assessing patients following access construction (Table 2). The decision to intervene depends upon the severity of symptoms and the physical findings. Severe ischemia and threat of tissue loss will typically require operative intervention.

### Table 1 Incidence of Ischemic Steal Syndrome

<table>
<thead>
<tr>
<th>First Author</th>
<th>Year</th>
<th>Study Design</th>
<th>No. of Patients/Procedures</th>
<th>Ischemia Symptoms</th>
<th>Ischemia Requiring Operative Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knox</td>
<td>2002</td>
<td>Retrospective review</td>
<td>1,138 patients over 6 years</td>
<td>Not described</td>
<td>55 (4.8%)</td>
</tr>
<tr>
<td>Valentine</td>
<td>2002</td>
<td>Prospective review</td>
<td>72 patients over 3 years</td>
<td>Not described</td>
<td>14 (19%)</td>
</tr>
<tr>
<td>Papasavas</td>
<td>2003</td>
<td>Prospective review</td>
<td>35 patients</td>
<td>6 (17%)</td>
<td>3 (9%)</td>
</tr>
<tr>
<td>Lazarides</td>
<td>2003</td>
<td>Retrospective review of proximal procedures</td>
<td>569 procedures</td>
<td>Not described</td>
<td>24 (4.2%)*</td>
</tr>
<tr>
<td>Davidson</td>
<td>2003</td>
<td>Prospective review</td>
<td>325 procedures on 217 patients</td>
<td>4 (1.2%)</td>
<td>16 (4.9%)</td>
</tr>
<tr>
<td>Meyer</td>
<td>2002</td>
<td>Retrospective review</td>
<td>1,253 patients over 5 years</td>
<td>Not described</td>
<td>21 (1.7%)</td>
</tr>
<tr>
<td>Morsy</td>
<td>1998</td>
<td>Retrospective review</td>
<td>409 procedures on 352 patients over 5 years</td>
<td>Not described</td>
<td>13/299 (4.3%) of AV grafts, 2/110 (1.8%) AV fistulas</td>
</tr>
</tbody>
</table>

*Describes 28 cases but 4 patients were referrals and not part of the original 569 procedures.

### Table 2 Classification of Steal Symptoms in Patients with Arteriovenous Shunts

<table>
<thead>
<tr>
<th>Grade</th>
<th>Symptoms</th>
<th>Treatment</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>No steal</td>
<td>None</td>
</tr>
<tr>
<td>1</td>
<td>Mild</td>
<td>Cool extremity with few symptoms but steal demonstrable by flow augmentation with access occlusion</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>Intermittent ischemia only during dialysis/claudication</td>
</tr>
<tr>
<td>3</td>
<td>Severe</td>
<td>Ischemic pain at rest/tissue loss</td>
</tr>
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Management of ischemic steal syndrome
Infection

Pseudoaneurysm

Venous aneurysm

Giant aneurysm
MESSAGE

- PRE-OP SELECTION
- ASSESSMENT WITH DUPLEX ULTRASOUND
- LOUPES
- INSTRUMENTS
- METICULOUS TECHNIQUE

Friday, 22 June 2012
Thank You