

ANNEXES TO CHAPTER 5

**Clinical Question XXI. What is the approach to native or prosthetic arteriovenous fistula diagnosed with steal syndrome?**

Scheltinga (2009) considers that the surgical approach is indicated in patients with symptoms of severe steal syndrome when conservative strategies (modifying antihypertensive medication, use of antispasmodic agents or anticoagulants or rheological agents) have failed.

There is general agreement that treatment goals should be two-fold: relieve the ischaemia and preserve the access.

There are a wide variety of surgical treatment options. Scali (2011) lists the following:

- Ligation of the access.
- Correction of arterial inflow at the stenosis/occlusion.
- Flow-limiting procedures (for example, banding, reducing outflow, reducing anastomosis).
- PAI: proximalisation of arterial inflow.
- RUDI: revision using distal inflow.
- Ligation of the artery distal to the anastomosis.
- DRIL: distal revascularisation and interval ligation.
- Distal revascularisation without interval ligation.

No RCT have been found directly comparing different surgical approaches with each other.

The available evidence comes from clinical series, without comparator group, or expert opinions which are based on clinical series and/or their own experience. Therefore, the available evidence is of low or very low quality.

Beathard (2013) believes the choice of treatment should be based on the characteristics of each patient, the patient's clinical condition and prognosis, disease stage, the location of the arterial anastomosis, and the level of blood flow within the access.

Beathard's algorithm for choice of surgical treatment is shown in Figure 1.

Similarly, Scali (2011) proposes another algorithm (Figure 2), and stresses that the choice of the optimal technique should be based on the following variables: the timing and severity of symptoms, in conjunction with the type of access, its anticipated durability, the patient's comorbidities, the extent of the occlusive disease and the availability of venous conduit.

<p><b>Banding</b></p> <p>Banding consists of reducing the diameter of the anastomosis and can be achieved by narrowing the exit vein by placing a smaller prosthetic ring around it or by inserting a conical segment with a smaller lumen.</p>	<p><b>Low quality</b></p>
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## Spanish Clinical Guidelines on Vascular Access for Haemodialysis

<p>A review by Scheltinga (2009) includes the information from 39 clinical series which analyse the efficacy of the <i>banding</i> technique in patients with steal syndrome at the end of the vascular access.</p> <p>In 16 of the studies, including 55 patients in total, the intervention was performed without an intraoperative monitoring tool or guided only by palpation. The clinical success rate (reversal of ischaemic symptoms) was 60%, (33/55) and the access patency rate was 53% (29/55).</p> <p>In 23 studies, including a total of 170 patients, the intervention was performed guided by intraoperative access flow measurements in combination with the return of pulsations or finger pressure using photoplethysmography. For these patients overall, the clinical success rate was 89% (152/171) and the access patency rate, after a median follow-up of 17 months, was 97% (148/152).</p> <p>Scheltinga (2009) considered the banding technique to be the method of choice in patients with steal syndrome with a normal or high access flow rate (&gt;1.2 litres/min), provided the flow and distal perfusion were monitored intraoperatively.</p> <p>For patients with normal to low flow (1200 to 300 ml/min) they recommend the DRIL or PAI techniques.</p>	
<p><b>Ligation of the distal radial artery</b></p> <p>Simple ligation of the access is an effective option for correcting the ischaemic symptoms in the case of complication of a distal access, but it sacrifices the access, and also limits the patient's long-term access options.</p> <p>However, the non-systematic review by Scali (2009) considers it to be a reasonable option in the following situations:</p> <ul style="list-style-type: none"> <li>- cases of acute steal syndrome in a vascular access with graft with poor patency;</li> <li>- patients with severe comorbidities that contradict a bigger intervention;</li> <li>- cases where the lumen is so restricted that the DRIL technique would be impossible;</li> <li>- patients in whom ischaemic symptoms persist after failure of a previous procedure (for example, DRIL or <i>banding</i>).</li> </ul>	<p><b>Very low quality</b></p>
<p><b>DRIL technique (artery ligation distal to the vascular access anastomosis and revascularisation more distally with a bypass)</b></p> <p>Scali (2011) considers the DRIL technique to now be the optimal treatment because it reverses ischaemic symptoms and salvages the access in approximately 90% of cases.</p> <p>Beathard (2013) discusses the results of various clinical series, reporting that success was achieved in 78-90% of patients treated with the DRIL technique. Nevertheless, they do not consider this technique to be the best procedure for the treatment of steal syndrome. They point out that although distal perfusion significantly improved, the degree of improvement appeared to be flow-dependent, and was less pronounced in cases of higher blood flow rates in fistulae. They assert that this problem does not occur with the PAI technique, which they consider to be at least equivalent to if not better than the DRIL, and that the DRIL procedure is being abandoned in favour of the PAI.</p>	<p><b>Very low quality</b></p>

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<p><b>PAI (proximalisation of arterial inflow) technique</b></p> <p>Scali (2011) considered the PAI technique to be attractive because it does not require ligation of an axial artery, and may be an appropriate option for patients who do not have a suitable conduit for the DRIL technique. However, they note that published experience is quite limited and that there are several drawbacks: it requires the conversion of an autogenous access to a combined prosthetic and autogenous access, and this increases the risk of infectious and thrombotic complications; thrombotic complications being of particular concern given the small gauge of the graft.</p>		<p><b>Very low quality</b></p>
<p><b>Summary of evidence</b></p>		
<p>Expert opinion, based on their experience and on clinical series, states that the choice of surgical treatment should be based on the characteristics of each patient, the patient's clinical condition and prognosis, disease stage, the location of the arterial anastomosis, and the level of blood flow within the access.</p>		<p><b>Low quality</b></p>
<p>Experts disagree on which of the two techniques, DRIL and PAI, is most suitable.</p>		<p><b>Very low quality</b></p>
<p><b>Patients' values and preferences</b></p> <p><i>No relevant studies related to this aspect have been identified.</i></p>		
<p><b>Use of resources and costs</b></p> <p><i>No relevant studies related to this aspect have been identified.</i></p>		
<p><b>Recommendations [Proposal]</b></p>		
<p><b>Weak</b></p>	<p>The choice of surgical treatment should be based on the characteristics of each patient, the patient's clinical condition and prognosis, disease stage, the location of the arterial anastomosis, and the level of blood flow within the access.</p>	
<p><b>References</b></p> <p>Beathard GA1, Spergel LM. Hand ischemia associated with dialysis vascular access: an individualized access flow-based approach to therapy. <i>Semin Dial.</i> 2013 May-Jun; 26(3):287-314.</p> <p>Scali ST, Huber TS. Treatment strategies for access-related hand ischemia. <i>Semin Vasc Surg.</i> 2011 Jun; 24(2):128-36.</p> <p>Scheltinga MR1, Van Hoek F, Bruyninckx CM. Surgical banding for refractory hemodialysis access-induced distal ischemia (HAIDI). <i>J Vasc Access.</i> 2009 Jan-Mar; 10(1):43-9.</p>		

Figure 1. Choice of treatment algorithm proposed by Beathard (2013)  
(DASS: dialysis access-related steal syndrome)

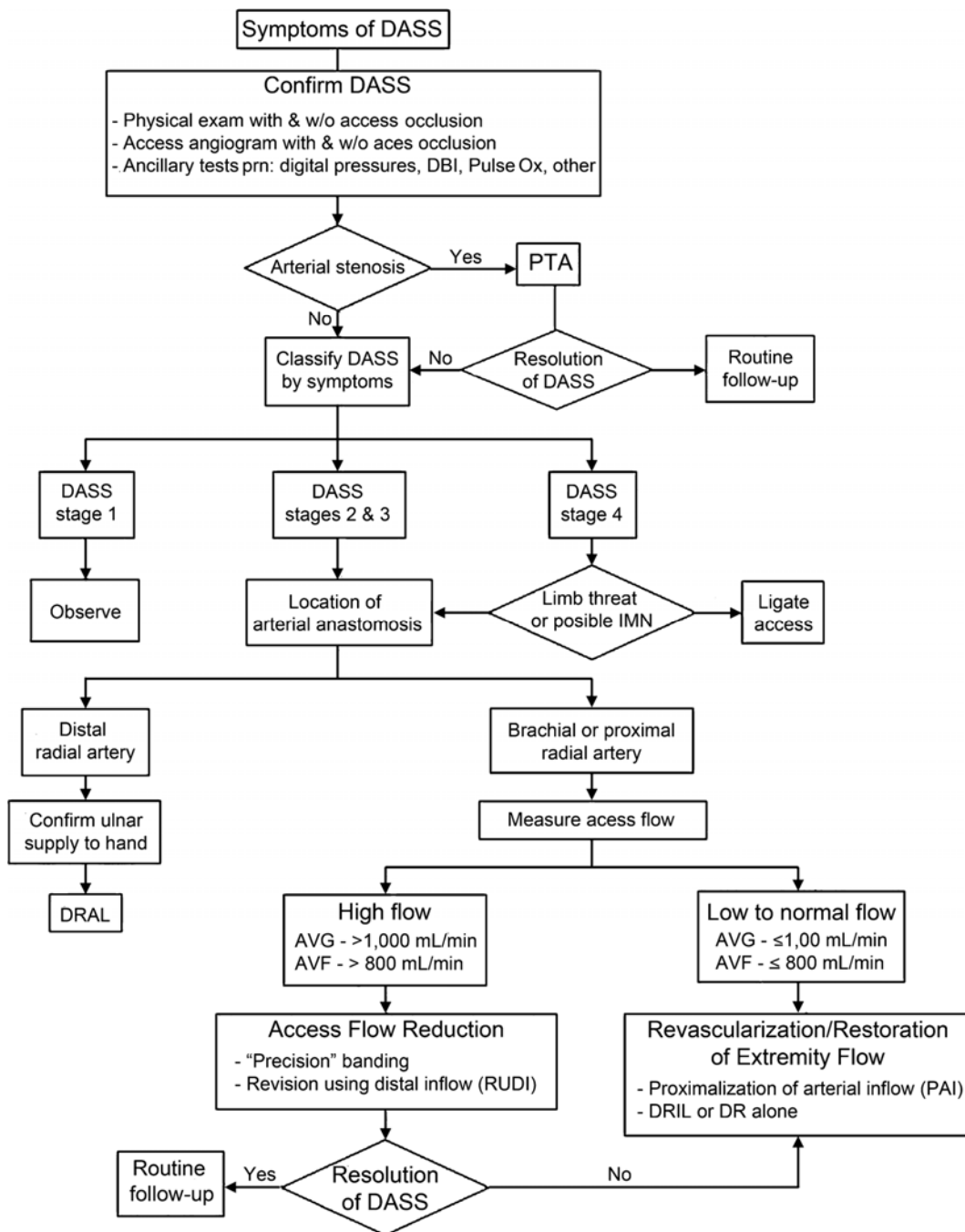


Figure 2. Choice of treatment algorithm proposed by Scali (2011)  
(ARHI: Access-Related Hand Ischaemia)

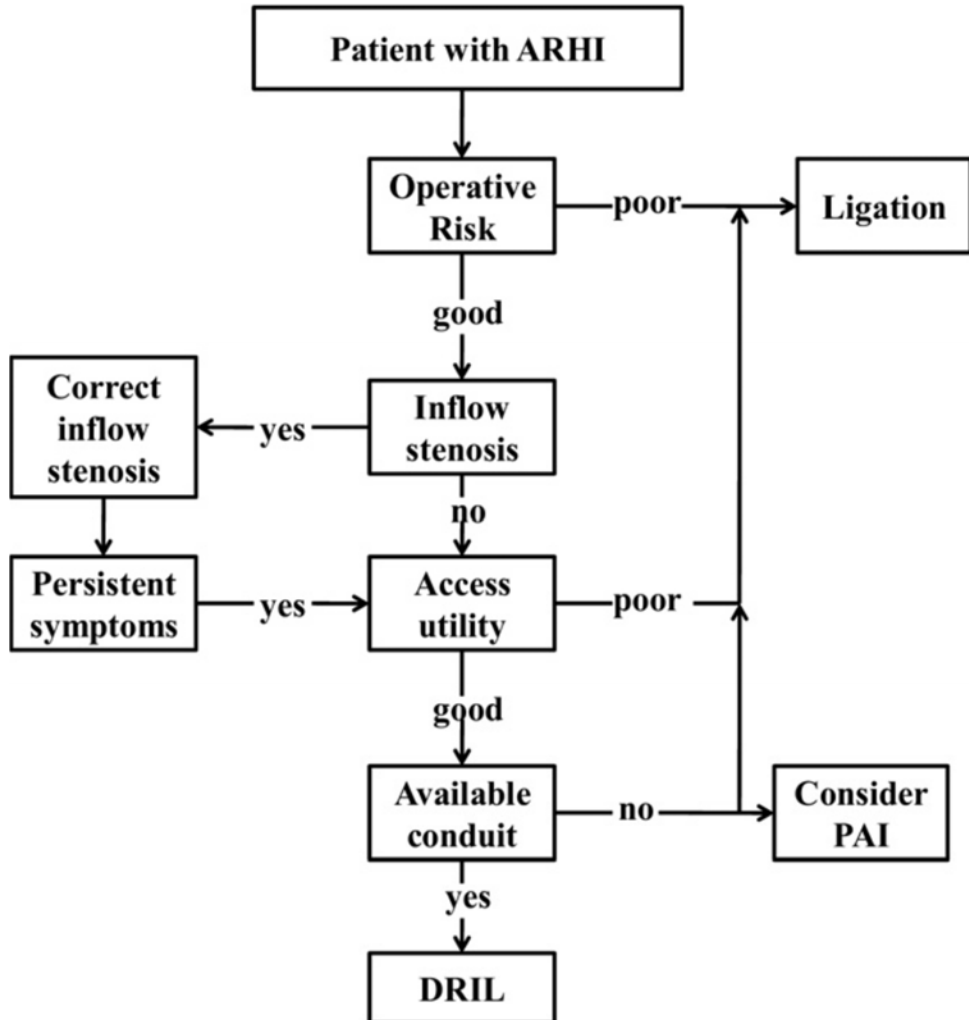


Table 1. STUDIES EXCLUDED: None

**GRADE TABLES**

**Date:** 2014-04-01

**Question:** Should Banding without intraoperative monitoring be used for steal syndrome?

**Bibliography:** Scheltinga MR1, Van Hoek F, Bruyninckx CM. Surgical banding for refractory hemodialysis access-induced distal ischemia (HAIDI). J Vasc Access. 2009 Jan-Mar; 10(1):43-9.

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Banding without intraoperative monitoring	Control	Relative (95% CI)	Absolute		
<b>Clinical success rate (recovery from the ischaemic symptoms)</b>												
16	observational studies <sup>1</sup>	very serious <sup>1</sup>	no serious inconsistency	no serious indirectness	no serious imprecision	reporting bias <sup>2</sup>	33/55 (60%)	-	-	-		CRITICAL
<b>Access patency rate</b>												
16	observational studies <sup>1</sup>	very serious <sup>1</sup>	no serious inconsistency	no serious indirectness	no serious imprecision	reporting bias <sup>2</sup>	29/55 (52.7%)	-	-	-		CRITICAL

<sup>1</sup> Case series

<sup>2</sup> Quote: This overview suffers from various types of bias. Publication bias may have influenced results as surgeons could have been reluctant to share negative experiences with banding.

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Question: Should Banding with intraoperative monitoring be used for steal syndrome?

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<b>Clinical success rate (recovery from the ischaemic symptoms)</b>												
23	observational studies <sup>1</sup>	very serious <sup>1</sup>	no serious inconsistency	no serious indirectness	no serious imprecision	reporting bias <sup>2</sup>	152/171 (88.9%)	-	-	-		CRITICAL
<b>Access patency rate (follow-up mean 17 months)</b>												
23	observational studies <sup>1</sup>	very serious <sup>1</sup>	no serious inconsistency	no serious indirectness	no serious imprecision	reporting bias <sup>2</sup>	148/152 (97.4%)	-	-	-		CRITICAL

<sup>1</sup> Case series

<sup>2</sup> Quote: This overview suffers from various types of bias. Publication bias may have influenced results as surgeons could have been reluctant to share negative experiences with banding.