

ANNEXES TO CHAPTER 6

**Clinical Question XXIV. In patients who cannot undergo native arteriovenous fistula creation, is the central venous catheter the vascular access of choice versus prosthetic arteriovenous fistula?**

The systematic review with meta-analysis by Ravani (2013) shows evidence published until September 2012 on outcomes of different types of vascular access, catheters and grafts among them. No RCT directly comparing these options were found.

<p>The above review carried out different meta-analyses of observational studies, showing that the people who used catheters had poorer outcomes than those with grafts in the following outcome measures, the differences being statistically significant in all cases:</p> <ul style="list-style-type: none"> <li>- <u>all-cause mortality</u>: RR 1.38, 95% CI: 1.25-1.52 (15 cohorts from 13 studies, 394,992 patients). Annual risk in those with graft: 0.24; additional number of events per 1000 patient-years for using catheter: 91 (95% CI: 60-125). When studying the heterogeneity in the analysis of all-cause mortality [<math>I^2</math>: 86.2%, <math>p &lt; 0.01</math>], they found weaker associations in studies that had a smaller proportion of males.</li> <li>- <u>fatal infection</u>: RR 1.49, 95% CI: 1.15-1.93 (11 cohorts from 10 studies, 235,176 patients). Annual risk in those with graft: 0.04; additional number of events per 1000 patient-years for using catheter: 17 (95% CI: 5-32).</li> <li>- <u>non-fatal infection</u>: RR 2.78, 95% CI: 1.80-4.29 [<math>I^2</math>: 91.9%, <math>p &lt; 0.01</math>] (17 cohorts from 17 studies, 13,121 patients).</li> <li>- <u>severe cardiovascular event</u>: RR 1.26, 95% CI: 1.11-1.43 (8 cohorts from 7 studies, 234,819 patients). Annual risk in those with graft: 0.11; additional number of events per 1000 patient-years for using catheter: 28 (95% CI: 12-46).</li> <li>- <u>hospitalisation</u>: RR 1.51, 95% CI: 1.30 to 1.75) compared to individuals with grafts (4 cohorts from 4 trials, 56,734 patients).</li> </ul>	<p><b>Low quality</b></p>
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**Summary of evidence**

<p>A meta-analysis of observational studies shows that compared to the use of prosthetic grafts, the use of catheters is associated with poorer outcomes in all-cause mortality, risk of fatal and non-fatal infection, risk of a severe cardiovascular event and of being admitted to hospital.</p>	<p><b>Low quality</b></p>
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**Patients' values and preferences**

*No relevant studies related to this aspect have been identified.*

**Use of resources and costs**

James (2009) estimated that, in the Canadian context, the average cost of placing and maintaining the vascular access in incident patients for haemodialysis was \$13,543 for a graft and \$10,638 for a central venous catheter. For maintenance of the access, costs were \$5,866 and \$3,842 respectively.

## Spanish Clinical Guidelines on Vascular Access for Haemodialysis

<b>Recommendations [Proposal]</b>	
<b>Weak</b>	In patients in whom it is not possible to create a native fistula, we recommend inserting a prosthetic graft rather than a central venous catheter.
<b>References</b>	
<p>Bray BD, Boyd J, Daly C, Donaldson K, Doyle A, Fox JG, Innes A, Khan I, Peel RK, Severn A, Shilliday I, Simpson K, Stewart GA, Traynor J, Metcalfe W; Scottish Renal Registry. Vascular access type and risk of mortality in a national prospective cohort of haemodialysis patients. <i>QJM</i>. 2012 Nov; 105(11):1097-103.</p> <p>Dhingra RK, Young EW, Hulbert-Shearon TE, Leavey SF, Port FK. Type of vascular access and mortality in U.S. hemodialysis patients. <i>Kidney Int</i>. 2001 Oct; 60(4):1443-51.</p> <p>James MT, Manns BJ, Hemmelgarn BR, Ravani P; Alberta Kidney Disease Network. What's next after fistula first: is an arteriovenous graft or central venous catheter preferable when an arteriovenous fistula is not possible? <i>Semin Dial</i>. 2009 Sep-Oct; 22(5):539-44.</p> <p>Quarello F, Forneris G, Borca M, Pozzato M. Do central venous catheters have advantages over arteriovenous fistulas or grafts? <i>J Nephrol</i>. 2006 May-Jun; 19(3):265-79.</p> <p>Ravani P, Palmer SC, Oliver MJ, Quinn RR, MacRae JM, Tai DJ, Pannu NI, Thomas C, Hemmelgarn BR, Craig JC, Manns B, Tonelli M, Strippoli GF, James MT. Associations between hemodialysis access type and clinical outcomes: a systematic review. <i>J Am Soc Nephrol</i>. 2013 Feb; 24(3):465-73.</p>	

**Table 1. STUDIES EXCLUDED**

<b>Study</b>	<b>Cause for exclusion</b>
Bray 2012	Compares the central venous catheters with fistula or graft together, but does not compare catheter with graft, or provide a breakdown of the information to make such an analysis possible.
Quarello 2006	Narrative review, not systematic, which also compares the central venous catheters with fistula or graft together. Date of search closure not specified.
Dingra 2001	Observational study included in the Ravani (2013) review.
James 2009	Narrative review. There is a more recent systematic review by the same group: the review by Ravani (2013). Only cost data are included in this file.

GRADE TABLES

Date: 2014-01-17

Question: Should central venous catheter vs graft be used in patients without possibility of native VA?

Bibliography: Ravani P, Palmer SC, Oliver MJ, Quinn RR, MacRae JM, Tai DJ, Pannu NI, Thomas C, Hemmelgarn BR, Craig JC, Manns B, Tonelli M, Strippoli GF, James MT. Associations between hemodialysis access type and clinical outcomes: a systematic review. J Am Soc Nephrol. 2013 Feb; 24(3):465-73.

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Central venous catheter	Graft	Relative (95% CI)	Absolute		
<b>Mortality due to any cause</b>												
13	observational studies	serious <sup>1</sup>	serious <sup>2</sup>	no serious indirectness	no serious imprecision	none	-	-	RR 1.38 (1.25 to 1.52)	-		CRITICAL
								0%		-		
<b>Fatal infection</b>												
10	observational studies	serious <sup>1</sup>	no serious inconsistency	no serious indirectness	no serious imprecision	none	-	-	RR 1.49 (1.15 to 1.93)	-		CRITICAL
								0%		-		
<b>Non-fatal infection</b>												
17	observational studies	serious <sup>1</sup>	serious <sup>3</sup>	no serious indirectness	no serious imprecision	none	-	-	RR 2.78 (1.80 to 4.29)	-		CRITICAL
								0%		-		
<b>Serious cardiovascular event</b>												
7	observational studies	serious <sup>1</sup>	no serious inconsistency	no serious indirectness	no serious imprecision	none	-	-	RR 1.26 (1.11 to 1.43)	-		CRITICAL
								0%		-		

Hospitalisation												
4	observational studies	serious <sup>1</sup>	no serious inconsistency	no serious indirectness	no serious imprecision	none	-	-	RR 1.51 (1.30 to 1.75)	-		CRITICAL
								0%		-		

<sup>1</sup> Observational studies. High risk of screening bias.

<sup>2</sup> High statistical heterogeneity. I<sup>2</sup>: 86.2%.

<sup>3</sup> High statistical heterogeneity. I<sup>2</sup>: 91.9%.