

Guidelines should be international and based on solid evidence and not take into account local resources or availabilities

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Faculty Disclosure

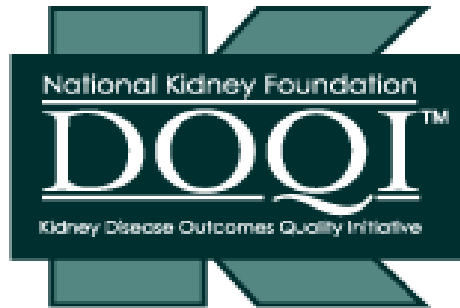
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I have **no financial relationships** to disclose.

Fifty years of vascular access in HD patients

- **Renal failure and renal replacement therapy have become an epidemic disease**
- **HD population demographics changed from young, non-comorbid to elderly, multiple comorbid patients**
- **Great burden on dialysis facilities and healthcare providers and costs**
- **Improvement in dialysis modalities/VA techniques and AVG material**
- **Multiple guidelines notify on preferred access: 1. AVF ; 2. AVG; 3. CVC**

Vascular Access Clinical Practice Guidelines of the European Society of Vascular Surgery



EUROPEAN BEST PRACTICE GUIDELINES

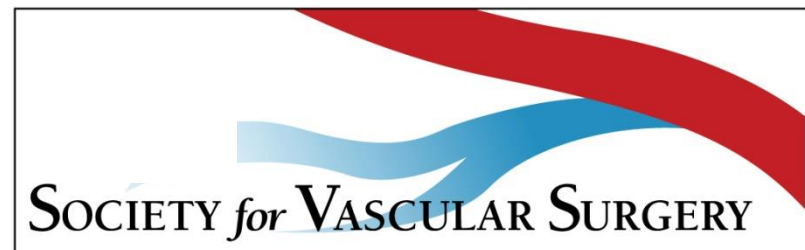
» **European Renal Best Practice:**
Sticking to the evidence



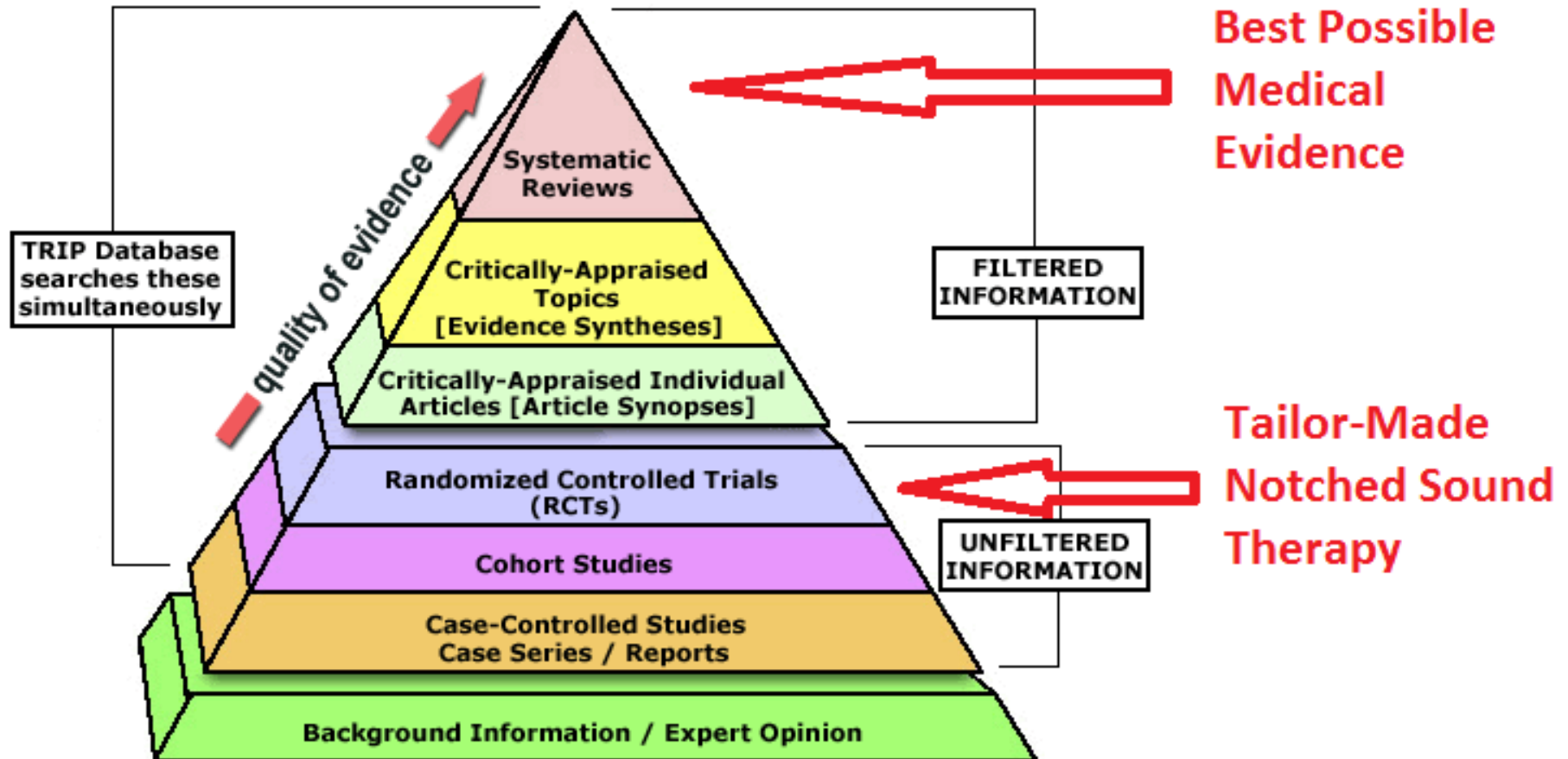
www.european-renal-best-practice.org



CLINICAL PRACTICE GUIDELINES FOR THE SURGICAL PLACEMENT AND MAINTENANCE OF ARTERIOVENOUS HEMODIALYSIS ACCESS



Evidence-based guidelines



Evidence & recommendations

Grade of recommendation	I Strong recommendation to do	Ila Moderate recommendation to do	Ilb Weak recommendation to do	III Recommendation not to do
Conclusions of evidence	Benefits >>> risk & burdens	Benefits >> risk & burdens	Benefits >= risks & burdens	No benefit / Potentially harm
A High level of evidence Consistent evidence from well performed and high quality studies or systematic reviews (low risk of bias, direct, consistent, precise)	Strong recommendation based on high level of evidence	Moderate recommendation based on high level of evidence	Weak recommendation based on high level of evidence	Recommendation based on high level of evidence
B Moderate / Low level of evidence Evidence from studies or systematic reviews with few important limitations	Strong recommendation based on moderate/ low level of evidence	Moderate recommendation based on moderate/ low level of evidence	Weak recommendation based on moderate/ low level of evidence	Recommendation based on moderate/ low level of evidence
C Very low level of evidence Evidence from studies with serious flaws. Only expert opinion, or standards of care	Strong recommendation based on expert opinion	Moderate recommendation based on very low level of evidence Diverging expert opinions	Weak recommendation based on very low level of evidence Diverging expert opinions	Recommendation based on very low level of evidence Expert opinion

Wording in recommendations:

We recommend
We should
Is recommended
Is indicated
Is useful
Is beneficial
Is effective

We suggest
Is reasonable
Is probably recommended
Can be useful
Can be beneficial
Can be effective

We might suggest
Might be reasonable
Might be considered
Usefulness is unknown

We do not recommend
Should not be performed
Is not useful
Is not beneficial
Is not effective
Is potentially harmful

Vascular Access Practice

Reality of evidence-based guidelines

	KDOQI 2006			I	EBPG 2007		
	A	B	C		II	III	IV
Preoperative assessment	2	6		0	1	2	2
Strategy	3	13		0	1	3	0
Cannulation	3	6		0	0	2	2
Monitoring	10	5		0	1	0	1
Complications	0	45		0	3	9	1
Catheters	2	6		0	2	5	0
Organisation	0	19		--	--	--	--
	20	100		0	8	21	6
ESVS vascular access guidelines (release march 2017)	5	32	46				

PUB MED “Hemodialysis Vascular Access”

**2007-2016 26 meta analyses
94 systematic reviews
86 randomized studies**

GRADE Working Group grades of evidence

- **High quality:** Further research is very unlikely to change our confidence in the estimate of effect
- **Moderate quality:** Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate
- **Low quality:** Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate
- **Very low quality:** We are very uncertain about the estimate

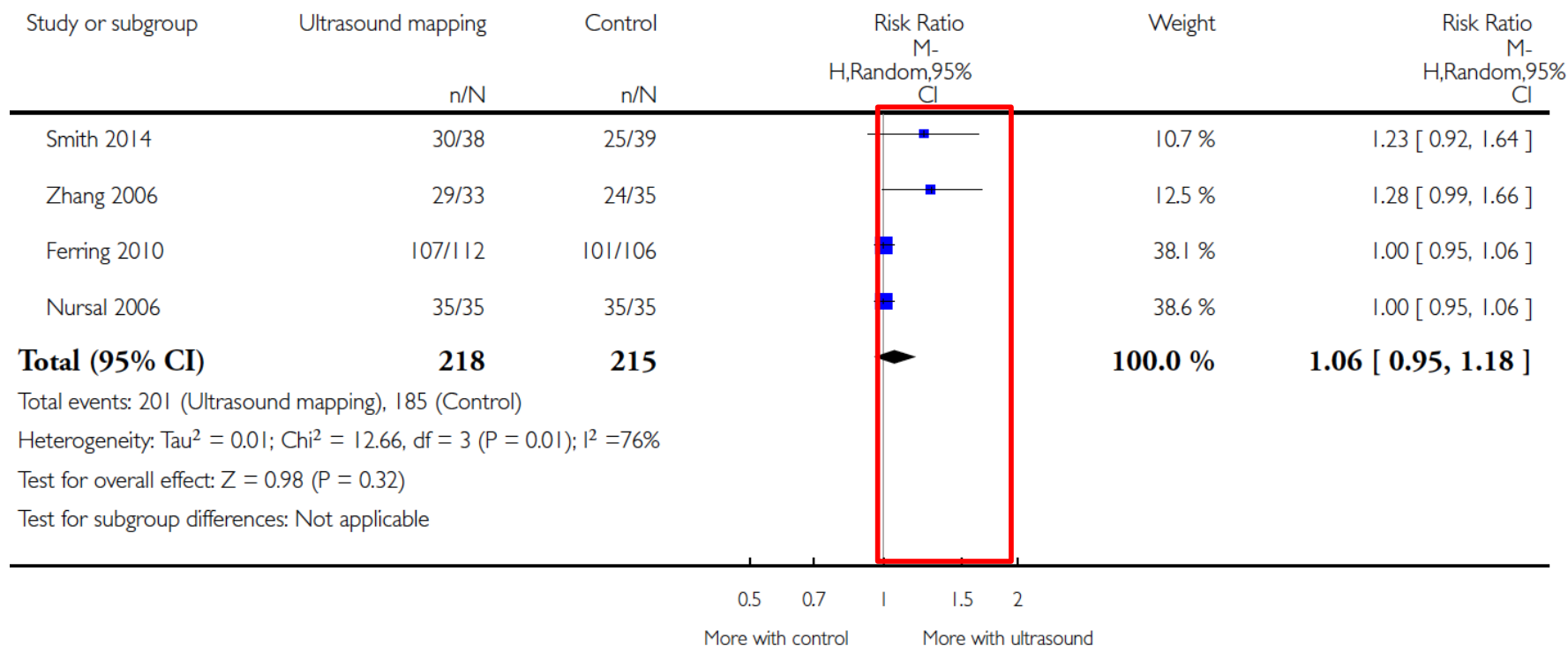
Preoperative vascular access evaluation for hemodialysis patients (Review)

Analysis 1.1. Comparison 1 Preoperative vessel imaging by ultrasound mapping versus standard preoperative care, Outcome 1 Fistulae created.

Review: Preoperative vascular access evaluation for haemodialysis patients

Comparison: 1 Preoperative vessel imaging by ultrasound mapping versus standard preoperative care

Outcome: 1 Fistulae created



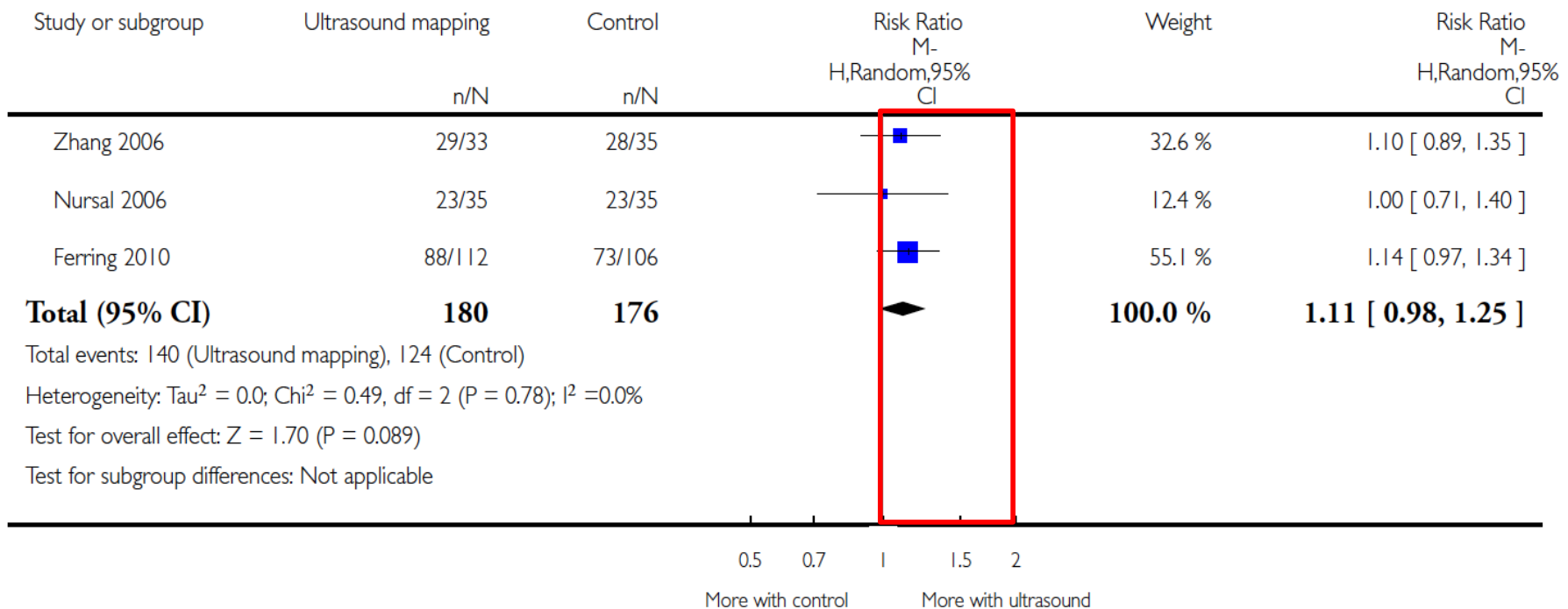
Preoperative vascular access evaluation for hemodialysis patients (Review)

Analysis 1.2. Comparison 1 Preoperative vessel imaging by ultrasound mapping versus standard preoperative care, Outcome 2 Matured fistulae.

Review: Preoperative vascular access evaluation for haemodialysis patients

Comparison: 1 Preoperative vessel imaging by ultrasound mapping versus standard preoperative care

Outcome: 2 Matured fistulae



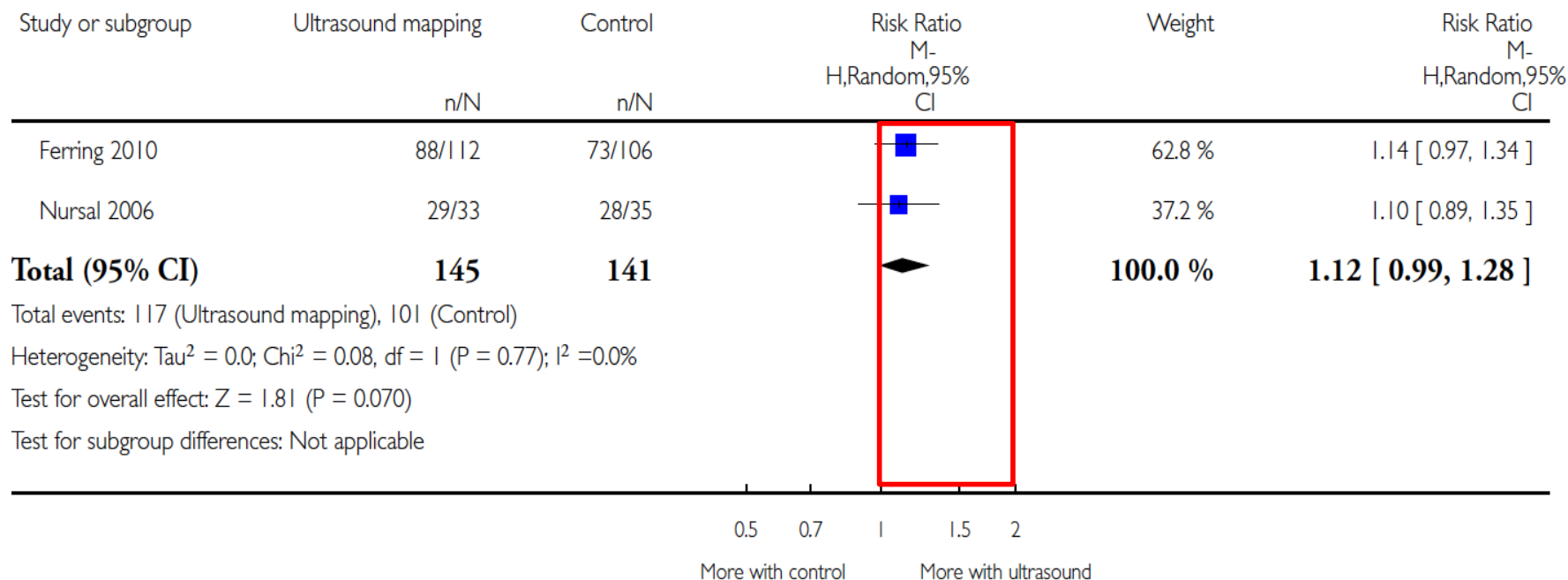
Preoperative vascular access evaluation for hemodialysis patients (Review)

Analysis 1.3. Comparison 1 Preoperative vessel imaging by ultrasound mapping versus standard preoperative care, Outcome 3 Fistulae used for dialysis.

Review: Preoperative vascular access evaluation for haemodialysis patients

Comparison: 1 Preoperative vessel imaging by ultrasound mapping versus standard preoperative care




Outcome: 3 Fistulae used for dialysis



Preoperative vascular access evaluation for hemodialysis patients (Review)

Risk of bias in randomized studies

	Ferring 2010	Nursal 2006	Smith 2014	Zhang 2006	
	+	+	?	-	Random sequence generation (selection bias)
	+	?	+	-	Allocation concealment (selection bias)
	+	?	?	-	Blinding of participants and personnel (performance bias)
	+	?	?	-	Blinding of outcome assessment (detection bias)
	-	+	+	-	Incomplete outcome data (attrition bias)
	+	?	-	-	Selective reporting (reporting bias)
	+	?	?	-	Other bias

 Low risk of bias
  Unclear risk of bias
  High risk of bias

Preoperative vascular access evaluation for hemodialysis patients (Review)

Preoperative vessel imaging by duplex ultrasound mapping versus standard preoperative care for arteriovenous access creation in haemodialysis (HD) patients						
Patient or population: HD patients with arteriovenous fistulas						
Intervention: routine preoperative vessel imaging by ultrasound versus standard preoperative care						
Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Number of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Standard care	Vessel imaging by ultra-sound				
Fistulas created Assessed by surgeon ¹ Follow-up: 1 day	Study population		RR 1.02 (0.94 to 1.12)	433 (4)	⊕○○○ very low ^{2, 3}	
	909 per 1000	927 per 1000 (855 to 1000)				
	Moderate risk					
	953 per 1000	972 per 1000 (896 to 1000)				
Fistulas matured Clinical assessment by experienced HD nurse ⁴ Follow-up: 6 to 12 months	705 per 1000	782 per 1000 (690 to 881)	RR 1.11 (0.98 to 1.25)	356 (3)	⊕⊕○○ low ^{3, 4}	
Fistulas used for dialysis Clinical assessment by HD nurse Follow-up: 6 to 24 months	716 per 1000	802 per 1000 (709 to 917)	RR 1.12 (0.99 to 1.28)	286 (2)	⊕⊕○○ low ^{3, 4}	

- Based on four small studies, preoperative vessel imaging did not improve fistula outcomes compared with standard care. Adequately powered prospective studies are required to fully answer this question

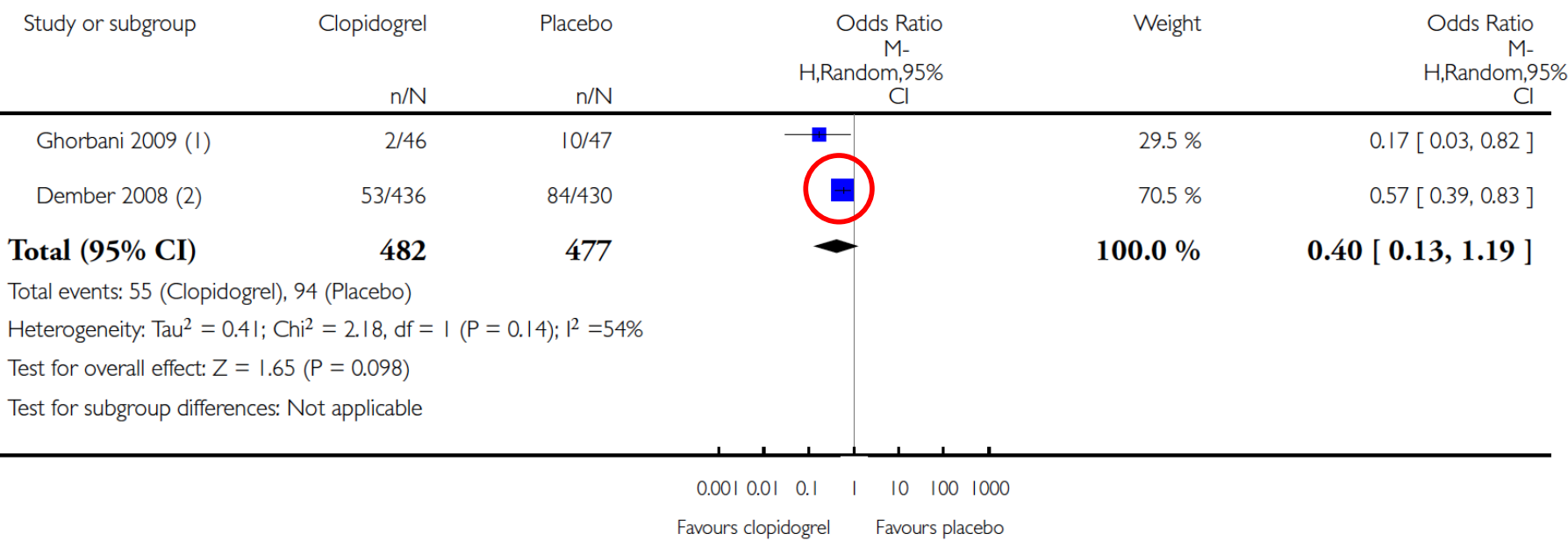
Medical adjuvant treatment to increase patency of arteriovenous fistulae and grafts (Review)

Analysis 7.1. Comparison 7 Clopidogrel versus placebo, Outcome 1 Graft thrombosis.

Review: Medical adjuvant treatment to increase patency of arteriovenous fistulae and grafts

Comparison: 7 Clopidogrel versus placebo

Outcome: 1 Graft thrombosis



Medical adjuvant treatment to increase patency of arteriovenous fistulae and grafts (Review)

Andrassy 1974	Crowther 2002	Dember 2008	Dwivedi 2014	Fiskerstrand 1984	Ghorbani 2009	Grontoft 1985	Grontoft 1998	Harter 1979	Hye 2014	Lok 2012	Michie 1977	Peden 2013	Schmitz 2002	Sreedhara 1994	
?	+	+	?	?	+	?	+	?	?	+	?	+	+	?	Random sequence generation (selection bias)
?	+	+	?	?	+	?	+	?	?	+	?	+	+	?	Allocation concealment (selection bias)
?	?	+	+	?	+	?	?	+	+	+	?	+	+	+	Blinding of participants and personnel (performance bias)
?	+	+	+	?	+	?	?	?	?	+	?	+	?	+	Blinding of outcome assessment (detection bias)
+	+	-	+	?	-	-	?	+	+	+	+	+	+	+	Incomplete outcome data (attrition bias)
?	?	+	?	?	?	-	?	?	+	+	?	+	?	?	Selective reporting (reporting bias)
+	-	+	-	+	+	+	-	?	-	+	+	-	+	+	Other bias



Low risk of bias



Unclear risk of bias



High risk of bias

Multicenter randomized study

Effect of Clopidogrel on Early Failure of Arteriovenous Fistulas for Hemodialysis

- Randomized study
- Multicenter study (9 US centers) inclusion 866 patients
8 fistulae per center/per year!!!
- Prevalence
3 fistulae per surgeon/ per year!!!
- Fistula surgeries were performed at 27 hospitals by 71 surgeons
Enough local resources or availabilities?
- Adherence to study medication was present in 87% of participants assigned to clopidogrel and for 86% of participants assigned to placebo

Multicenter randomized study

Effect of Clopidogrel on Early Failure of Arteriovenous Fistulas for Hemodialysis

Table 2. Fistula Thrombosis

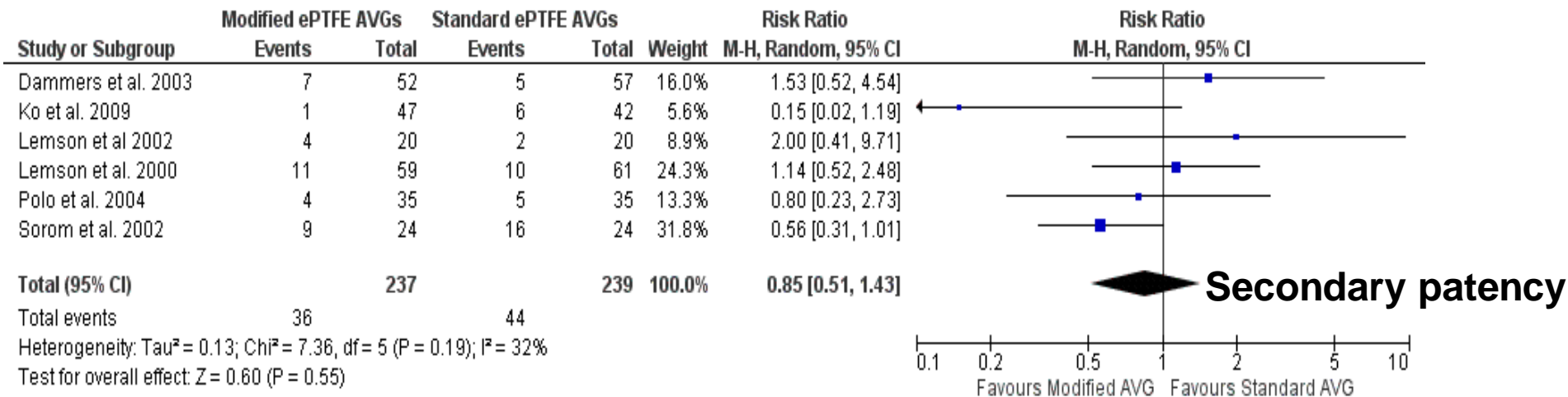
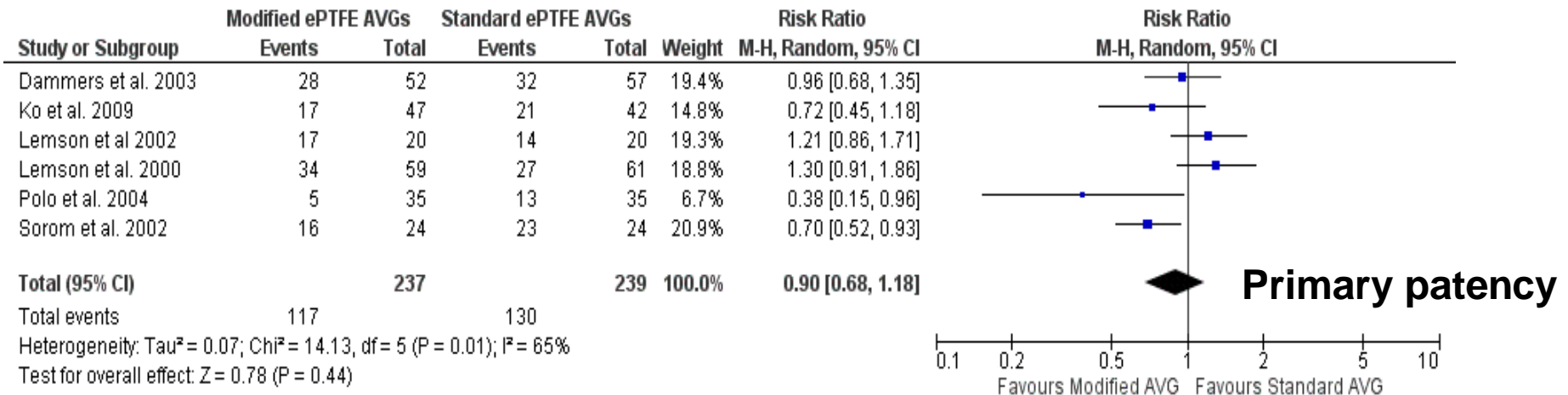
	No. (%) of Patients		Relative Risk (95% Confidence Interval) ^b
	Clopidogrel (n = 435) ^a	Placebo (n = 431) ^a	
Thrombosis at 6 wk (all patients)	53 (12.2)	84 (19.5)	0.63 (0.46-0.97) ^c
By location			
Forearm fistula	31 (12.9)	60 (24.7)	0.53 (0.36-0.77)
Upper arm fistula	22 (11.3)	24 (12.8)	0.89 (0.52-1.53)

Primary failure rate 61.8 and 59.5%!!!

	No. (%) of Patients		Relative Risk (95% Confidence Interval) ^b
	Clopidogrel (n = 385) ^a	Placebo (n = 373) ^a	
Suitability failure (all patients)	238 (61.8)	222 (59.5)	1.05 (0.94-1.17) ^c
By location			
Forearm fistula	144 (66.9)	137 (64.0)	1.05 (0.92-1.20)
Upper arm fistula	94 (55.3)	85 (53.4)	1.05 (0.87-1.27)
By failure reason			
Fistula abandoned with no expectation of future use	115 (29.9)	134 (35.9)	0.85 (0.69-1.03)
Fistula not yet in use despite treatment with dialysis	57 (14.8)	47 (12.6)	1.17 (0.83-1.66)
Fistula in use during ascertainment period but failed to meet suitability criteria	66 (17.1)	41 (11.0)	1.56 (1.08-2.24)

The Effect of Anastomosis and Graft Geometry on AVG Patency in Hemodialysis Patients

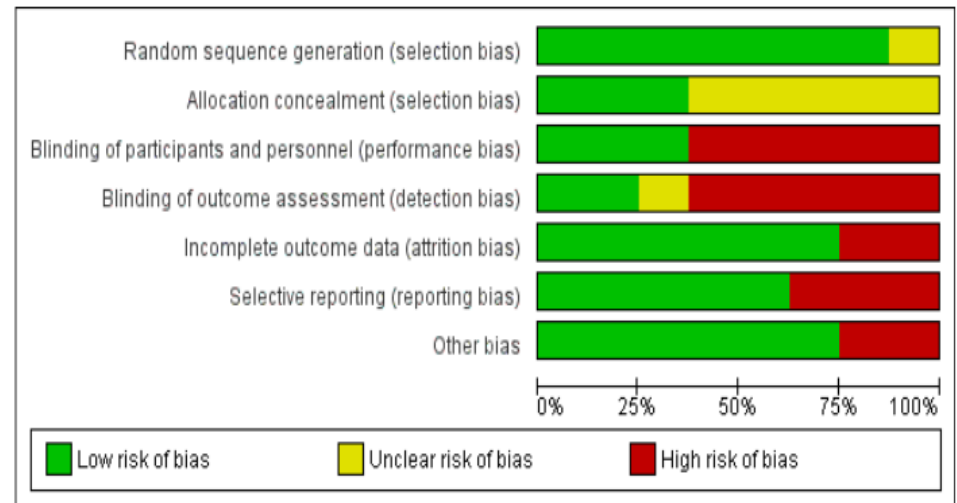
a systematic review



The Effect of Anastomosis and Graft Geometry on AVG Patency in Hemodialysis Patients

a systematic review

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Dammers et al. 2003	+	+	+	+	+	-	+
Gagne et al. 2000	?	?	-	-	-	+	-
Ko et al. 2009	+	+	+	?	-	-	+
Lemson et al. 2000	+	?	+	+	+	+	+
Lemson et al 2002	+	?	+	+	+	+	+
Liu et al. 2006	+	?	-	-	+	+	+
Polo et al. 2004	+	+	+	+	+	+	-
Sorom et al. 2002	+	?	+	+	+	-	+








Risk of Bias analysis overview

- No blinding for surgeon or patient
- Primary patency was only defined as “functioning well” making it is assessment subjective

Meta-analysis





Surgical vs mechanical thrombectomy vs pharmacomechanical thrombolysis for thrombosed dialysis grafts

Comparison: 01 Surgical Thrombectomy vs. Endovascular Thrombectomy
Outcome: 04 90 Day Primary Patency

Study	Endovascular n/N	Surgery n/N	RR (95%CI Fixed)	Weight %	RR (95%CI Fixed)
Marston 1997	45 / 59	31 / 56		32.0	1.36[1.05,1.81]
Schuman 1994	6 / 15	4 / 18		3.9	1.60[0.56,4.58]
Vesely 1996	6 / 10	7 / 10		7.0	0.86[0.45,1.64]
Vesely 1999	70 / 82	53 / 71		57.1	1.14[0.97,1.35]
Total(95%CI)	127 / 166	95 / 153		100.0	1.22[1.05,1.40]

Test for heterogeneity chi-square=2.72 df=3 p=0.44
 Test for overall effect z=2.68 p=0.007

Comparison: 01 Surgical Thrombectomy vs. Endovascular Thrombectomy
Outcome: 05 1 Year Primary Patency

Study	Endovascular n/N	Surgery n/N	RR (95%CI Fixed)	Weight %	RR (95%CI Fixed)
Brooks 1987	18 / 24	10 / 19		13.2	1.43[0.88,2.31]
Dougherty 1999	34 / 39	30 / 41		34.6	1.19[0.96,1.49]
Marston 1997	54 / 59	43 / 56		52.2	1.19[1.01,1.40]
Total(95%CI)	106 / 122	83 / 116		100.0	1.22[1.07,1.40]

Test for heterogeneity chi-square=0.53 df=2 p=0.77
 Test for overall effect z=2.97 p=0.003

.1 .2 1 5 10
 Favours endovascular Favours surgery

Meta-analysis

Surgical vs mechanical thrombectomy vs pharmacomechanical thrombolysis for thrombosed dialysis grafts

- **Meta-analysis supports the use of surgical techniques for graft thrombectomy**
- **However several flaws of included randomized studies:**
 - **small numbers of included patients**
 - **different thrombectomy devices**
 - **additional thrombolysis in some studies**
 - **one multicenter study with large differences in technical success rate (25% to 100%)**
 - **different surgical procedures**

Evidence-based guidelines & quality of studies

What about:

- **Quality of randomized studies**
- **Power analysis**
- **Randomization protocol**
- **Number of including centers/ included patients per center**
- **Violation of study protocol**
- **Missing values**
- **Local practice & experience**