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# INTERMITTENT CATHETERISATION: WHICH CATHETER DESIGNS, TECHNIQUES AND STRATEGIES AFFECT THE INCIDENCE OF UTI, OTHER COMPLICATIONS AND USER ACCEPTIBILITY? A COCHRANE SYSTEMATIC REVIEW

#### Hypothesis / aims of study

Do catheter designs or technique impact on incidence of UTI, other complications, user acceptability or cost-effectiveness? The following catheters or techniques were compared:

- single-use (sterile) versus multiple use (clean) catheters
- one catheter design versus another (e.g. hydrophilic coated versus uncoated)
- sterile versus clean catheterisation technique

#### Study design, materials and methods

We searched the Cochrane Incontinence Group Specialised Trials Register (updated Sept 2013), reference lists of relevant articles, conference proceedings and contacted other investigators for unpublished data. Inclusion criteria were randomised controlled trials or randomised crossover trials comparing at least two different catheter designs, catheterisation techniques or strategies. Two reviewers assessed the methodological quality of trials and abstracted data as per standard Cochrane methods.

#### Results

Thirty-one trials met the inclusion criteria (13 RCTs and 18 crossover trials) with 17 studies added since 2008. Most were small (less than 60 participants completed), although five trials had more than 100 participants. A total of 1737 participants were enrolled and 1388 completed (80%). 60% of subjects were male. There was considerable variation in length of follow-up and definitions of UTI. There were no significant differences in the number of UTIs between:

- single-use (sterile) catheters versus multiple use (clean) catheters (Figure 1)
- hydrophilic (single-use) vs uncoated (multi-use) (Figure 2)
- hydrophilic-coated vs uncoated (single use both arms) (Figure 3)
- sterile versus clean catheterisation technique

Nor were there any significant differences in other complications or user acceptability. In all but one trial that included hydrophilic coated products, the attrition rate was higher in the hydrophilic arm compared to the control arm (Figure 4).

	Single us	е агт	Multiple us	е агт		Risk Ratio		Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	Year	M-H, Fixed, 95% CI
King 1992	5	23	3	23	6.8%	1.67 [0.45, 6.17]	1992	<del></del>
Duffy 1995	20	38	22	42	47.4%	1.00 [0.66, 1.53]	1995	<del>-</del>
Sutherland 1996	3	16	4	14	9.7%	0.66 [0.18, 2.44]	1996	
Pachler 1999	1	32	1	32	2.3%	1.00 [0.07, 15.30]	1999	
Prieto-Fingerhut 1999	9	14	8	15	17.5%	1.21 [0.65, 2.23]	1999	<del></del>
Schlager 2001	2	10	2	10	4.5%	1.00 [0.17, 5.77]	2002	
Leek 2013	2	12	2	10	5.0%	0.83 [0.14, 4.90]	2013	
Moore 2013	2	45	3	45	6.8%	0.67 [0.12, 3.80]	2013	<del></del>
Total (95% CI)		190		191	100.0%	1.02 [0.74, 1.40]		•
Total events	44		45					
Heterogeneity: Chi² = 1.	54, df = 7 (P	= 0.98);	I <sup>2</sup> = 0%					10.4
Test for overall effect: Z = 0.12 (P = 0.91)								0.01 0.1 1 10 10 Single use arm Multiple use arr

Figure 1. Single-use (sterile) vs multi-use (clean) catheters: No. with UTI

	Ехрегіт	ental	tal Control			Risk Ratio		Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	Year	M-H, Fixed, 95% CI
Sutherland 1996	3	16	4	14	51.6%	0.66 [0.18, 2.44]	1996	<del></del>
Pachler 1999	1	32	1	32	12.1%	1.00 [0.07, 15.30]	1999	
Moore 2013	2	45	3	45	36.3%	0.67 [0.12, 3.80]	2013	
Total (95% CI)		93		91	100.0%	0.70 [0.26, 1.87]		-
Total events	6		8					
Heterogeneity: Chi²=	0.08, df = 1	2 (P = 0)	U.1	1 01 1 10 100				
Test for overall effect:	Z = 0.71 (F	o = 0.48	)					urs (experimental) Favours (control)

Figure 2. Hydrophilic (single-use) vs uncoated (multi-use): No. with UTI

	Experim	ental	Control		Risk Ratio		Risk Ratio	
Study or Subgroup	Events	Total	<b>Events</b>	Total	Weight	M-H, Fixed, 95% C	M-H, Fixed, 95% CI	
Cardenas 2009	12	22	14	25	20.6%	0.97 [0.58, 1.63]		
De Ridder 2005	39	61	51	62	79.4%	0.78 [0.62, 0.97]	•	
Total (95% CI)		83		87	100.0%	0.82 [0.67, 1.01]	•	
Total events	51		65					
Heterogeneity: Chi² = 0.64, df = 1 (P = 0.42); l² = 0%								
Test for overall effect:	Z = 1.91 (F	P = 0.06	)				0.01 0.1 1 10 100 Hydrophilic coated Uncoated	

Figure 3. Hydrophilic-coated vs uncoated (single use both arms): No. with UTI

	Ехрегіт	ental	Contr	rol	Risk Ratio			Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Random, 95% CI	Year	M-H, Random, 95% CI
Sutherland 1996	1	17	2	16	0.7%	0.47 [0.05, 4.70]	1996	<del></del>
Vapnek 2003	9	31	5	31	4.1%	1.80 [0.68, 4.76]	2003	+
De Ridder 2005	36	61	29	62	33.8%	1.26 [0.90, 1.77]	2005	<del> -</del>
Cardenas 2011	63	108	47	116	52.2%	1.44 [1.10, 1.89]	2006	<b>=</b>
Cardenas 2009	6	28	5	28	3.4%	1.20 [0.41, 3.48]	2009	<del></del>
Moore 2013	11	34	7	32	5.8%	1.48 [0.65, 3.34]	2013	<del> -</del>
Total (95% CI)		279		285	100.0%	1.37 [1.13, 1.67]		<b> </b> ◆
Total events	126		95					
Heterogeneity: Tau <sup>2</sup> =	= 0.00; Chi²	²= 1.58,	df = 5 (P	= 0.90	); I <sup>z</sup> = 0%		0.0	1 0.1 1 10 100
Test for overall effect	Z = 3.15 (8)	P = 0.00	12)					rs [experimental] Favours [control]

Figure 4. Attrition Rate: Hydrophilic-coated vs uncoated catheters

## Interpretation of results

There were no significant differences between any of the comparisons for any outcome. Most studies were small and underpowered. Where there were data, confidence intervals were wide and hence clinically important differences in UTI could neither be identified nor reliably ruled out. Attrition was a problem which may have led to bias. There was considerable variation in length of follow-up and definitions of UTI. No studies addressed cost effectiveness.

### Concluding message

Despite 31 randomised trials on intermittent catheterisation, there is still no convincing evidence that UTI are affected by the use of single use catheters, by catheters with specialised coatings or by the use of sterile technique. In particular cost-effectiveness has yet to be established.

#### Disclosures

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