Title: The Efficacy and Safety of Knotless Barbed Sutures in the Surgical Field: A Systematic Review and Meta-analysis of Randomized Controlled Trials

Authors

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Supplementary Figure Legends:

Appendix Figure 1: A forest plot of suturing time of different surgeries with or without barbed suture

Appendix Figure 2: A forest plot of suturing time of different barbed types with or without barbed suture

Appendix Figure 3: A forest plot of operative time of different surgeries with or without barbed suture

Appendix Figure 4: A forest plot of operative time of different barbed types with or without barbed suture

Appendix Figure 5: A forest plot of estimated blood loss of different surgeries with or without barbed suture

Appendix Figure 6: A forest plot of estimated blood loss of different barbed types with or without barbed suture

Appendix Figure 7: A forest plot of postoperative complications of different surgeries with or without barbed suture

Appendix Figure 8: A forest plot of postoperative complications of different barbed types with or without barbed suture

Appendix Figure 9: Sensitivity analyses of postoperative complications of different barbed types with or without barbed suture

Appendix Figure 10: Funnel plot of suturing time in all included studies

Appendix Figure 11: Funnel plot of operative time in all included studies

Appendix Figure 12: Funnel plot of estimate blood loss in all included studies

Appendix Figure 13: Funnel plot of postoperative complications in all included studies

Appendix Table 1: Quality assessment of studies in the meta-analysis based on Cochrane recommendations

Appendix Figure 1: A forest plot of suturing time of different surgeries with or without barbed suture

Study or Subgroup	Ba Mean	arbed SD	Total	C Mean	ontrol SD	Total	Weight	Mean Difference IV, Random, 95% CI	Year	Mean Difference IV, Random, 95% CI
1.1.1 Laparoscopic n	yomecto	omy					-			
Alessandri 2010	11.5	4.1	22	17.4	3.8	22	7.8%	-5.90 [-8.24, -3.56]	2010	_ —
Ardovino 2013A	6.6	4.7	36	11.8	6.1	81	7.9%	-5.20 [-7.23, -3.17]		- -
Subtotal (95% CI)			58			103	15.7%	-5.50 [-7.03, -3.97]		•
Heterogeneity: Tau ² =	0.00: CI	$hi^2 = 0$	0.20. d	f = 1 (P)	= 0.6	6): I ² =	0%			-
Test for overall effect:						- 17 -				
112 Lanarosconis h	vetoroct	-								
1.1.2 Laparoscopic h	,	,	10							_
Ardovino 2013B	3.9	2	18	6.6	3.7	43	8.1%	-2.70 [-4.14, -1.26]		
Einarsson 2013 Subtotal (95% CI)	10.4	5.2	32 50	9.6	4.8	31 74	7.7% 15.9%	0.80 [-1.67, 3.27] -1.10 [-4.52, 2.32]		
Heterogeneity. Tau ² =	5.06: CI	$hi^2 = 5$	5.75 d	f = 1 (P)	= 0.0	$21:1^2 =$	83%			
Test for overall effect:						- ,, .				
1.1.3 Arthroplasty										
	0.0	4 7 7	101	14.4	2.00	202	0.2%	4 50 1 5 41 3 701	2014	_
Gililland 2014 Smith 2014	9.8		191		3.98	203	8.3%	-4.60 [-5.41, -3.79]		-
Smith 2014 Sah 2015	26.5		18 50	16.78		16 50	7.1% 8.3%	9.72 [6.18, 13.26]		_
San 2015 Subtotal (95% CI)	11.4	2.2	259	16.1	2.2	269	8.3% 23.7%	-4.70 [-5.56, -3.84] -0.66 [-4.43, 3.11]		
Heterogeneity: Tau ² =	10.04.	Chi² -		df - 2	(P 2 (
Test for overall effect:				, ui = 2	(- < (.0000.	1), 1 = 9.	/ /0		
1.1.4 Cosmotis surg										
1.1.4 Cosmetic surge	,	17.4	20	12.26	1 77	20	6.5%	4 40 1 0 07 0 041	2012	
Grigoryants 2013	7.87			12.36		30	6.5%	-4.49 [-8.97, -0.01]		
Rubin 2014 Subtotal (95% CI)	12	4.6	229 259	19.2	6.7	229 259	8.3% 14.8%	-7.20 [-8.25, -6.15] -6.76 [-8.72, -4.79]		
Heterogeneity: Tau ² =	0.92° CI	bi ² – ²		f = 1 /P	- 0.2			010 [012, 115]		•
Test for overall effect:						- ,, .				
1.1.5 Sacrocolpopexy	,									
Tan-Kim 2014	28.7	1 D G	32	47.2	15.9	32	5.0%	-13.60 [-20.63, -6.57]	2014	
Subtotal (95% CI)	20.7	12.0	32	42.5	15.9	32	5.0%	-13.60 [-20.63, -6.57]		
Heterogeneity: Not ap	plicable		52			52	5.070	15.00 [20.05, 0.57]		
Test for overall effect:		0 /P _	0.000	1)						
resctor overall effect.	2 = 3.73	9 (P =	0.000	1)						
1.1.6 Gastric bypass										
Milone 2013	12.8	1.4	30	24.1	2.2	30		-11.30 [-12.23, -10.37]		÷ 1
Subtotal (95% CI)			30			30	8.3%	-11.30 [-12.23, -10.37]		◆
Heterogeneity: Not ap										
Test for overall effect:	Z = 23.3	73 (P	< 0.00	001)						
1.1.7 Robot-assisted	laparos	copic	prosta	atectom	v					
Williams 2010	9.7	0.2	45	9.8	0.2	36	8.4%	-0.10 [-0.19, -0.01]	2010	4
Subtotal (95% CI)			45			36	8.4%	-0.10 [-0.19, -0.01]		
Heterogeneity: Not ap	plicable									
Test for overall effect:		4 (P =	0.03)							
1.1.8 Cesarean deliv	erv									
Murtha 2006	9.5	3 22	127	89	2.81	61	8.3%	0.60 [-0.30, 1.50]	2006	<u> -</u>
Subtotal (95% CI)	2.2	2.22	127	0.9	2.01	61	8.3%	0.60 [-0.30, 1.50]		•
Heterogeneity: Not ap	nlicable						2.270			T
Test for overall effect:		1 (P =	0.19)							
Total (95% CI)			860			864	100.0%	-2561-601 113		
Total (95% CI)	10.01	cu:2	860	05 -10	4.7.17		100.0%	-3.56 [-6.01, -1.12]		, , – , ,
Heterogeneity: Tau ² =					= 12 (F	< 0.00	JUU1); l*	= 99%		-20 -10 0 10
Test for overall effect:					- /-					barbed conventional
Test for subgroup diff	erences:	Chi ² =	= 654.2	28, df =	7 (P <	: 0.000	01), ' =	98.9%		

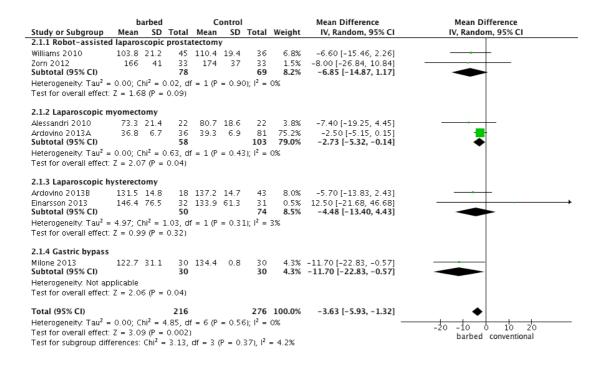
Appendix Figure 2: A forest plot of suturing time of different barbed types with or without

barbed suture

	В	arbed		C	ontrol			Std. Mean Difference		Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	Year	IV, Random, 95% CI
1.2.1 Unidirectional	barbed									
Williams 2010	9.7	0.2	45	9.8	0.2	36	8.0%	-0.50 [-0.94, -0.05]	2010	-
Alessandri 2010	11.5	4.1	22	17.4	3.8	22	7.4%	-1.47 [-2.14, -0.79]	2010	-
Milone 2013	12.8	1.4	30	24.1	2.2	30	5.5%	-6.05 [-7.28, -4.82]	2013	
Grigoryants 2013	7.87	12.4	30	12.36	1.72	30	7.8%	-0.50 [-1.02, 0.01]	2013	-
Rubin 2014	12	4.б	229	19.2	6.7	229	8.4%	-1.25 [-1.45, -1.05]	2014	+
Subtotal (95% CI)			356			347	37.1%	-1.75 [-2.69, -0.81]		•
Heterogeneity: Tau ² :	= 1.04; (Chi² =	77.26,	df = 4 (P < 0.	00001;	i; l ² = 959	6		
Test for overall effect	: Z = 3.6	55 (P =	0.000	3)						
1.2.2 Bidirectional b	arbed									
Murtha 2006	9.5	3.22	127	8.9	2.81	61	8.3%	0.19 [-0.11, 0.50]	2006	+
Einarsson 2013	10.4	5.2	32	9.6	4.8	31	7.9%	0.16 [-0.34, 0.65]	2013	+
Ardovino 2013B	3.9	2	18	6.6	3.7	43	7.7%	-0.81 [-1.38, -0.24]	2013	
Ardovino 2013A	6.6	4.7	36	11.8	6.1	81	8.1%	-0.90 [-1.31, -0.49]	2013	+
Gililland 2014	9.8	4.22	191	14.4	3.98	203	8.4%	-1.12 [-1.33, -0.91]	2014	-
Tan-Kim 2014	28.7	12.6	32	42.3	15.9	32	7.8%	-0.94 [-1.45, -0.42]	2014	-
Smith 2014	26.5	6.83	18	16.78	3.28	16	6.9%	1.74 [0.93, 2.54]	2014	
Sah 2015	11.4	2.2	50	16.1	2.2	50	7.9%	-2.12 [-2.61, -1.63]	2015	
Subtotal (95% CI)			504			517	62.9%	-0.51 [-1.13, 0.11]		◆
Heterogeneity: Tau ² :	= 0.74; (Chi² =	128.27	, df = 7	(P < 0	0.0000	1); $ ^2 = 95$	5%		
Test for overall effect	:Z = 1.6	50 (P =	0.11)							
Total (95% CI)			860			864	100.0%	-0.95 [-1.43, -0.46]		•
Heterogeneity: Tau ² :	= 0.71; (Chi² =	223.09	, df = 1	2 (P <	0.000	$(01); ^2 = 5$	95%		
Test for overall effect	: Z = 3.8	33 (P =	0.000	1)						-4 -2 0 2 4 barbed conventional
Test for subgroup dif	ferences	: Chi²	= 4.67,	df = 1	(P = 0	.03), I ²	= 78.6%			barbea conventional

Appendix Figure 3: A forest plot of operative time of different surgeries with or without

barbed suture

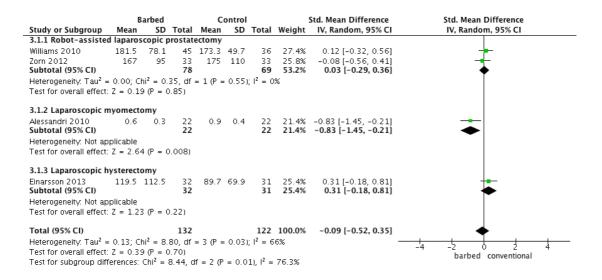


Appendix Figure 4: A forest plot of operative time of different barbed types with or without barbed suture

	barbed Control						Std. Mean Difference	Std. Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
2.2.1 Unidirectional b	arbed								
Alessandri 2010	73.3	21.4	22	80.7	18.6	22	9.5%	-0.36 [-0.96, 0.23]	-++
Milone 2013	122.7	31.1	30	134.4	0.8	30	12.7%	-0.52 [-1.04, -0.01]	
Williams 2010	103.8	21.2	45	110.4	19.4	36	17.3%	-0.32 [-0.76, 0.12]	
Zorn 2012 Subtotal (95% CI)	166	41	33 130	174	37	33 121	14.4% 53.8%		•
Heterogeneity: Tau ² =	0.00; C	hi ² = ().82, di	= 3 (P	= 0.85	5); ² =	0%		
Test for overall effect:	Z = 2.7	0 (P =	0.007)						
2.2.2 Bidirectional ba	rbed								
Ardovino 2013A	36.8	б.7	36	39.3	6.9	81	21.5%	-0.36 [-0.76, 0.03]	-=-
Ardovino 2013B	131.5	14.8	18	137.2	14.7	43	10.9%	-0.38 [-0.94, 0.17]	-++
Einarsson 2013	146.4	76.5		133.9	61.3	31	13.7%		
Subtotal (95% CI)			86			155	46.2%	-0.20 [-0.55, 0.16]	•
Heterogeneity: Tau ² =	0.04; C	$hi^2 = 3$	3.30, di	' = 2 (P	= 0.19	9); l ² =	39%		
Test for overall effect:	Z = 1.0	9 (P =	0.28)						
Total (95% CI)			216			276	100.0%	-0.28 [-0.46, -0.10]	•
Heterogeneity: Tau ² =	0.00; C	$hi^2 = 4$	1.66, di	= 6 (P	= 0.53	9); 1 ² =	0%		
Test for overall effect:	Z = 3.0	0 (P =	0.003)						-4 -2 0 2 4 barbed conventional
Test for subgroup diffe					P = 0.	50), I ²	= 0%		barbed conventional

Appendix Figure 5: A forest plot of estimated blood loss of different surgeries with or

without barbed suture



Appendix Figure 6: A forest plot of estimated blood loss of different barbed types with or

without barbed suture

	B	arbed		с	ontrol			Std. Mean Difference	:	Std. Mean Difference	
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI		IV, Random, 95% CI	
3.2.1 Unidirectional	barbed										
Alessandri 2010	0.6	0.3	22	0.9	0.4	22	21.4%	-0.83 [-1.45, -0.21]		_ 	
Williams 2010	181.5	78.1	45	173.3	49.7	36	27.4%	0.12 [-0.32, 0.56]		_ _	
Zorn 2012 Subtotal (95% CI)	167	95	33 100	175	110	33 91	25.8% 74.6%			-	
Heterogeneity: Tau ² =	0.14; C	hi ² = б.	24. df	= 2 (P =	0.04)	; l ² = 6	8%			_	
Test for overall effect:	Z = 0.82	5 (P = 0).40)								
3.2.2 Bidirectional ba	arbed 119.5	112.5	32	89.7	69.9	31	25.4%	0.31 [-0.18, 0.81]			
Subtotal (95% CI)			32			31	25.4%	0.31 [-0.18, 0.81]		★	
Heterogeneity. Not ap		- - - - - - - - - - - 	וככו								
Test for overall effect:	Z = 1.2	5 (P = C).22)								
Test for overall effect: Total (95% CI)	Z = 1.2.	5 (P = (132			122	100.0%	-0.09 [-0.52, 0.35]		•	
			132	= 3 (P =	• 0.03)			-0.09 [-0.52, 0.35]	-4 -	<u> </u>	

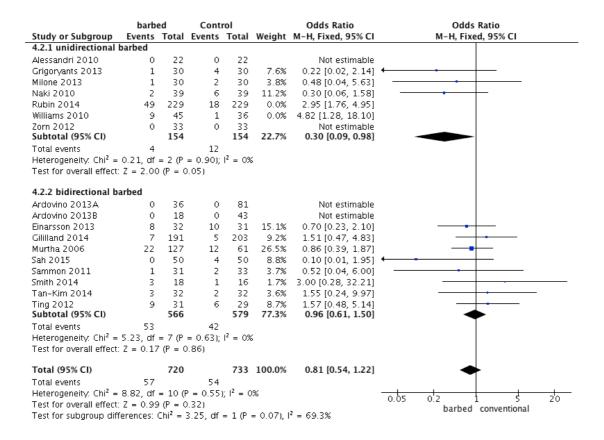
Appendix Figure 7: A forest plot of postoperative complications of different surgeries with or without barbed suture

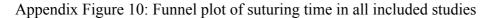
	barbed		trol	Walate	Peto Odds Ratio	Peto Odds Ratio
Study or Subgroup				weight	Peto, Fixed, 95% CI	Peto, Fixed, 95% CI
4.1.1 Robot-assisted	-	-	-	1 .00/		
Sammon 2011			2 33	1.9%	0.54 [0.05, 5.35]	
Williams 2010 Zarra 2012			1 36	5.6%	4.82 [1.28, 18.10]	
Zorn 2012 Subtotal (95% CI)		33 (09) 33 102	7.4%	Not estimable 2.79 [0.89, 8.79]	
				1.4/0	2.79 [0.09, 0.79]	
Total events Heterogeneity: Chi² = 2	10 262 df = 1		3	· • /		
Test for overall effect: 2			1, 1 = 02	/0		
4.1.2 Laparoscopic m						
Alessandri 2010			22		Not estimable	
Ardovino 2013A Subtotal (95% CI)		36 (58	0 81 103		Not estimable Not estimable	
Total events	0) 105		Not estimable	
Heterogeneity: Not app			,			
Test for overall effect: I		le				
4.1.3 Laparoscopic hy	sterectomy	1				
Ardovino 2013B		18 (Not estimable	
Einarsson 2013		32 10		8.3%	0.70 [0.24, 2.08]	
Subtotal (95% CI)		50	74	8.3%	0.70 [0.24, 2.08]	-
Total events	8	10)			
Heterogeneity: Not app Test for overall effect: 3		= 0.53)				
4.1.4 Cesarean delive	ry					
Murtha 2006	22 1	27 12	2 61	15.7%	0.85 [0.39, 1.88]	
Naki 2010			5 39	4.6%	0.33 [0.08, 1.42]	
Subtotal (95% CI)	1	66	100	20.3%	0.69 [0.34, 1.38]	◆
Total events	24	18	3			
Heterogeneity: Chi ² = 1	1.25, df = 1	(P = 0.26)); I ² = 20	1%		
Test for overall effect: 3	Z = 1.05 (P)	= 0.29)				
4.1.5 Arthroplasty						
Gililland 2014		91 5		7.4%	1.50 [0.48, 4.73]	
Sah 2015		50 é	4 50	2.5%	0.13 [0.02, 0.93]	
Smith 2014			1 16	2.3%	2.65 [0.34, 20.76]	
Ting 2012			5 29	7.3%	1.55 [0.49, 4.94]	
Subtotal (95% CI)		90	298	19.5%	1.19 [0.58, 2.41]	-
Total events	19	10				
Heterogeneity: Chi ² = 5 Test for overall effect: 3); l² = 48	1%		
4.1.6 Cosmetic surge						
Grigoryants 2013	1		4 30	3.0%	0.28 [0.04, 1.70]	
Grigoryants 2013 Rubin 2014	1 49 2	29 18	3 229	36.6%	2.95 [1.76, 4.95]	
Grigoryants 2013 Rubin 2014 Subtotal (95% CI)	1 49 2 2	29 18 59	3 229 259			
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events	1 49 2 2 50	29 18 59 22	B 229 259 2	36.6% 39.6%	2.95 [1.76, 4.95]	
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6	1 49 2 2 50 6.05, df = 1	29 18 59 (P = 0.01)	8 229 259 2); I ² = 83	36.6% 39.6%	2.95 [1.76, 4.95]	•
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 3 4.1.7 Gastric bypass	1 49 2 2 50 6.05, df = 1	29 18 59 22 (P = 0.01) = 0.0004)	8 229 259 2); I ² = 83	36.6% 39.6%	2.95 [1.76, 4.95] 2.47 [1.50, 4.06]	•
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 3 4.1.7 Gastric bypass Milone 2013	1 49 2 50 5.05, df = 1 Z = 3.56 (P	29 18 22 59 22 (P = 0.01) = 0.0004) 30 2	3 229 259 2; I ² = 83 2 30	36.6% 39.6% %	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02]	•
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 3 4.1.7 Gastric bypass Milone 2013 Subtotal (95% CI)	1 49 2 2 50 6.05, df = 1 Z = 3.56 (P	29 18 59 (P = 0.01) = 0.0004) 30 2 30	3 229 259 2; ² = 83 2 30 30	36.6% 39.6% %	2.95 [1.76, 4.95] 2.47 [1.50, 4.06]	*
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 3 4.1.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events	1 49 2 2 50 5.05, df = 1 Z = 3.56 (P 1 1	29 18 59 (P = 0.01) = 0.0004) 30 2 30	3 229 259 2; I ² = 83 2 30	36.6% 39.6% %	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02]	*
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 7 4.1.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events Heterogeneity: Not app	1 49 2 2 50 6.05, df = 1 Z = 3.56 (P 1 1 blicable	29 18 59 (P = 0.01) = 0.0004) 30 2 30 2	3 229 259 2; ² = 83 2 30 30	36.6% 39.6% %	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02]	•
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 3 4.1.7 Gastric bypass Milone 2013	1 49 2 2 50 6.05, df = 1 Z = 3.56 (P 1 1 blicable Z = 0.59 (P	29 18 59 (P = 0.01) = 0.0004) 30 2 30 2	3 229 259 2; ² = 83 2 30 30	36.6% 39.6% %	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02]	*
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 2 4.1.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events Heterogeneity: Not app Test for overall effect: 2 4.1.8 Sacrocolpopexy Tan-Kim 2014	1 49 2 50 6.05, df = 1 Z = 3.56 (P 1 1 blicable Z = 0.59 (P 3	29 18 59 27 (P = 0.01) = 0.0004) 30 27 30 27 = 0.56) 32 27 27 32 27 27 32 37 27 27 32 37 27 27 27 27 27 27 27 27 27 27 27 27 27	3 229 259 259 2 30 30 22 30 30 22 32 32 32 32 32 32 32 32 32 32 32 32	36.6% 39.6% % 1.8% 1.8% 3.0%	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02] 0.50 [0.05, 5.02]	*
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 2 4.1.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events Heterogeneity: Not app Test for overall effect: 2 4.1.8 Sacrocolpopexy Tan-Kim 2014 Subtotal (95% CI)	1 49 2 2 50 6.05, df = 1 Z = 3.56 (P 1 1 blicable Z = 0.59 (P 3	29 18 59 22 (P = 0.01) = 0.0004) 30 2 30 2 = 0.56) 32 2 3 32 32 3 32 3 32 3 32 3 33 3 3 3 3 3 3 3	3 229 259 2; 1 ² = 83 2 30 30 2 32 32 32	36.6% 39.6% % 1.8% 1.8%	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02] 0.50 [0.05, 5.02]	
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 3 A.1.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events Heterogeneity: Not app Test for overall effect: 3 4.1.8 Sacrocolpopexy Tan-Kim 2014 Subtotal (95% CI) Total events	1 49 2 2 50 6.05, df = 1 Z = 3.56 (P 1 1 blicable Z = 0.59 (P 3 3	29 18 59 22 (P = 0.01) = 0.0004) 30 2 30 2 = 0.56) 32 2 3 32 32 3 32 3 32 3 32 3 33 3 3 3 3 3 3 3	3 229 259 259 2 30 30 22 30 30 22 32 32 32 32 32 32 32 32 32 32 32 32	36.6% 39.6% % 1.8% 1.8% 3.0%	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02] 0.50 [0.05, 5.02]	
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Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 2 4.1.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events Heterogeneity: Not app Tan-Kim 2014 Subtotal (95% CI) Total events Heterogeneity: Not app Tast for overall effect: 2	$ \begin{array}{r} 1 \\ 49 \\ 2 \\ 2 \\ 50 \\ 5.05, df = 1 \\ Z = 3.56 (P \\ 1 \\ 1 \\ 1 \\ 2 \\ 2 \\ 2 \\ 2 \\ 3.56 (P \\ 1 \\ 3 \\ $	29 18 59 22 (P = 0.012 = 0.0004) 30 2 30 2 = 0.56) 32 2 3 32 2 3 32 2 3 32 2 3 32 2 3 3 2 3 3 2 3 3 2 3 3 3 3 3 3 3 3	3 229 259 2; 1 ² = 83 2 30 30 2 2 32 32 2 32 32	36.6% 39.6% % 1.8% 1.8% 3.0%	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02] 0.50 [0.05, 5.02] 1.53 [0.25, 9.38] 1.53 [0.25, 9.38]	
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 3 AL.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events Heterogeneity: Not app Test for overall effect: 3 AL.8 Sacrocolpopexy Tan-Kim 2014 Subtotal (95% CI) Total events Heterogeneity: Not app Test for overall effect: 3 Test for overall effect: 3 Test for overall effect: 3 Total (95% CI)	$ \begin{array}{r} 1 \\ 49 \\ 2 \\ 50 \\ 5.05, df = 1 \\ 2 = 3.56 (P \\ 1 \\ 1 \\ 1 \\ 2 = 0.59 (P \\ 3 \\ 3 \\ 0licable \\ Z = 0.59 (P \\ 3 \\ 3 \\ 0licable \\ Z = 0.46 (P \\ 9 \\ 7 \\ 9 \\ 9 \\ 9 \\ 7 \\ 9 \\ 9 \\ 7 \\ 9 \\ 9 \\ 9 \\ 7 \\ 9 \\ 9 \\ 7 \\ 9 \\ 9 \\ 7 \\ 9 \\ 7 \\ 7 \\ 7 $	29 18 $59 22$ $(P = 0.01)$ $= 0.0004$ $30 2$ $30 2$ $= 0.56$ $32 2$ $= 0.64$ 94	3 229 259 2); ² = 83 2 30 2 30 2 30 2 30 2 32 32 32 998	36.6% 39.6% % 1.8% 1.8% 3.0% 3.0% 3.0%	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02] 0.50 [0.05, 5.02]	
Grigoryants 2013 Rubin 2014 Subtotal (95% CI) Total events Heterogeneity: Chi ² = 6 Test for overall effect: 2 4.1.7 Gastric bypass Milone 2013 Subtotal (95% CI) Total events Heterogeneity: Not app Test for overall effect: 2 4.1.8 Sacrocolpopexy Tan-Kim 2014 Subtotal (95% CI)	$ \begin{array}{r} 1 \\ 49 \\ 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 50 \\ 7 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 2 = 3.56 (P \\ 1 \\ 1 \\ 1 \\ 2 = 0.59 (P \\ 3 \\ $	29 18 59 22 (P = 0.01) 30 23 30 23 30 23 32 23 23	3 229 259 2); ² = 83 2 30 30 2 32 32 32 998	36.6% 39.6% % 1.8% 1.8% 3.0% 3.0% 100.0%	2.95 [1.76, 4.95] 2.47 [1.50, 4.06] 0.50 [0.05, 5.02] 0.50 [0.05, 5.02] 1.53 [0.25, 9.38] 1.53 [0.25, 9.38] 1.44 [1.05, 1.97]	

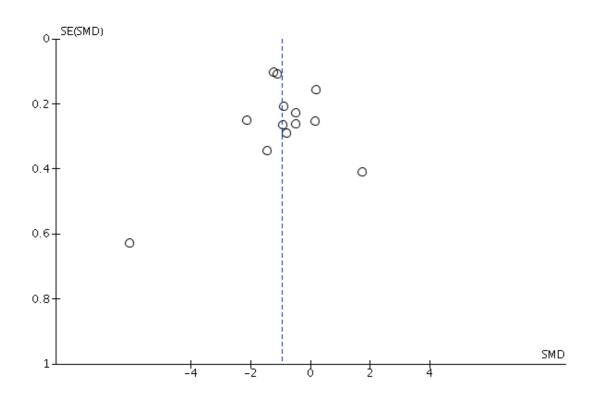
Appendix Figure 8: A forest plot of postoperative complications of different barbed types with or without barbed suture

	barb		Cont			Odds Ratio	Odds Ratio
Study or Subgroup		Total	Events	Total	Weight	M-H, Fixed, 95% CI	M–H, Fixed, 95% CI
4.2.1 unidirectional	barbed						
Alessandri 2010	0	22	0	22		Not estimable	
Grigoryants 2013	1	30	4	30	5.9%	0.22 [0.02, 2.14]	←
Milone 2013	1	30	2	30	2.9%	0.48 [0.04, 5.63]	
Naki 2010	2	39	6	39	8.7%	0.30 [0.06, 1.58]	
Rubin 2014	49	229	18	229	21.6%	3.19 [1.79, 5.67]	
Williams 2010	9	45	1	36	1.4%	8.75 [1.05, 72.73]	
Zorn 2012	0	33	0	33		Not estimable	
Subtotal (95% CI)		428		419	40.4%	2.13 [1.35, 3.35]	•
Total events	62		31				
Heterogeneity. Chi ² =	14.20, d	f = 4 (F)	$P = 0.00^{\circ}$	7); 12 =	72%		
Test for overall effect:	Z = 3.25	5 (P = 0	0.001)				
4.2.2 bidirectional b							
Ardovino 2013A	0	36	0	81		Not estimable	
Ardovino 2013B	0	18	0	43		Not estimable	
Einarsson 2013	8	32	10	31	11.6%	0.70 [0.23, 2.10]	
Gililland 2014	7	191	5	203	7.1%	1.51 [0.47, 4.83]	
Murtha 2006	22	127	12	61	20.4%	0.86 [0.39, 1.87]	
Sah 2015	0	50	4	50	6.8%	0.10 [0.01, 1.95]	←
Sammon 2011	1	31	2	33	2.9%	0.52 [0.04, 6.00]	
Smith 2014	3	18	1	16	1.3%	3.00 [0.28, 32.21]	
Tan-Kim 2014	3	32	2	32	2.8%	1.55 [0.24, 9.97]	
Ting 2012	9	31	6	29	6.7%	1.57 [0.48, 5.14]	
Subtotal (95% CI)		566		579	59.6%	0.96 [0.61, 1.50]	•
Total events	53		42				
Heterogeneity: Chi ² =				$ ^2 = 0\%$	5		
Test for overall effect:	Z = 0.17	7 (P = C).86)				
Total (95% CI)		994		998	100.0%	1.43 [1.05, 1.96]	◆
Total events	115		73				-
Heterogeneity: Chi ² =	24.47. d	f = 12	(P = 0.0)	2): $ ^2 =$	51%		
Test for overall effect:				.,			0.65 0.2 1 5 2'0
Test for subaroup dif				– 1 (P	= 0.01)	² = 83.7%	barbed conventional

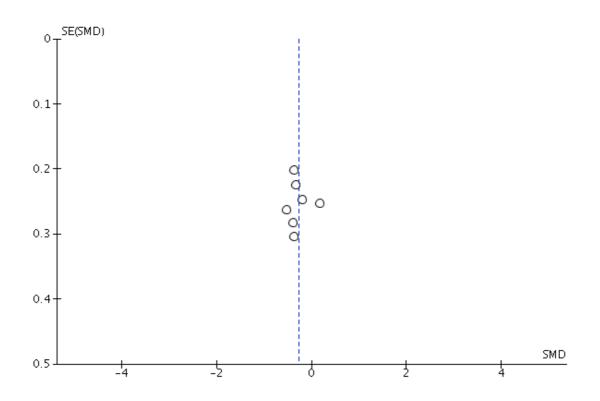
Appendix Figure 9: Sensitivity analyses of postoperative complications of different barbed types with or without barbed suture



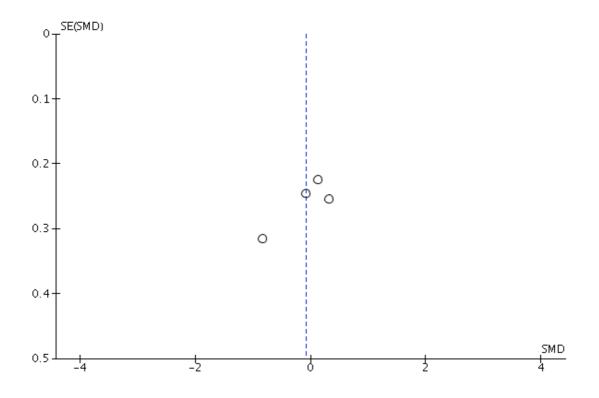




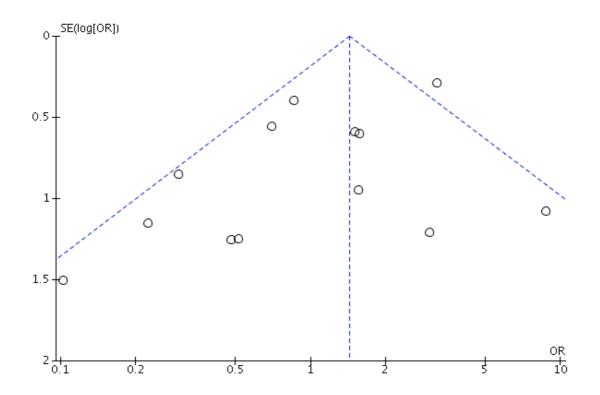
Appendix Figure 11: Funnel plot of operative time in all included studies



Appendix Figure 12: Funnel plot of estimate blood loss in all included studies



Appendix Figure 13: Funnel plot of postoperative complications in all included studies



Author	Random sequence	Allocation	Blinding of participants and	Blinding of outcome	Incomplete outcome data	Selective
year	generation	concealment	personnel	assessment		reporting
Murtha 2006	Subjects were randomized within strata in the ratio of two barbed suture subjects for every one control subject	Using a closed envelope system	Subjects, but not the operating surgeon/investigators, were blinded	Primary endpoint assessment was blinded	Lost follow-up in barbed/control group N(%): 4(3.1) / 2(3.2)	Not stated
Alessand		Sealed opaque			No	
ri 2010	Computer generated	envelope	Not stated	Not stated		Not stated
Naki 2010	Computer generated	Sealed opaque envelopes	Neither subjects nor the operating surgeon/ investigators were blinded	No	No	No
Williams	• • •	*			Lost follow-up in barbed/control	
2010	Computer generated	Not stated	Not stated	Not stated	group N(%): 1(2.2)/0	Not stated
Sammon					No	
2011	Computer generated	Not stated	Not stated	Not stated		Not stated
Ting		Sealed opaque			No	
2012	Computer generated	envelopes	Patients	No		No
Zorn 2012	After specimen entrapment, patients were randomized to either double-armed monofilament or barbed suture for PR and VUA	Not stated	Not stated	Not stated	No	Not stated
Ardovin					No	
o 2013	Computer generated	Not stated	Not stated	Not stated		Not stated
Ardovin	• • • •				No	
o 2013	Computer generated	Not stated	Not stated	Not stated		Not stated
Einarsso		Opaque sealed			No	
n 2013	Computer generated	envelopes	Not stated	Not stated		No
Grigorya		·			No	
nts 2013	Coin toss	Not stated	Not stated	A blinded evaluator		Not stated
Milone					No	
2013	Computer generated	Sealed envelopes	Not stated	Not stated		Not stated

Appendix Table 1: Quality assessment of studies in the meta-analysis based on Cochrane recommendations

Gililland 2014	The randomization occurred in the operating room	Not stated	All patients were blinded	Not stated	No	Not stated
Rubin				Evaluated by an	Lost follow-up in barbed/control	
2014				independent blinded	group N(%): 21(18.2)/4(3.5)	
	Computer generated	Not stated	Patients	plastic surgeon.		No
Smith	A random envelope was drawn which dictated the		Blinding the patients to the type of		No	
2014	type of suture to be used	Sealed envelopes	suture they received.	Not stated		Not stated
Tan-Kim		The sealed			No	
2014	Computer generated	envelope	Not stated	Blinded examiner		No
Sah 2015	Computer generated	Not stated	Not stated	Blind evaluation.	No	Not stated