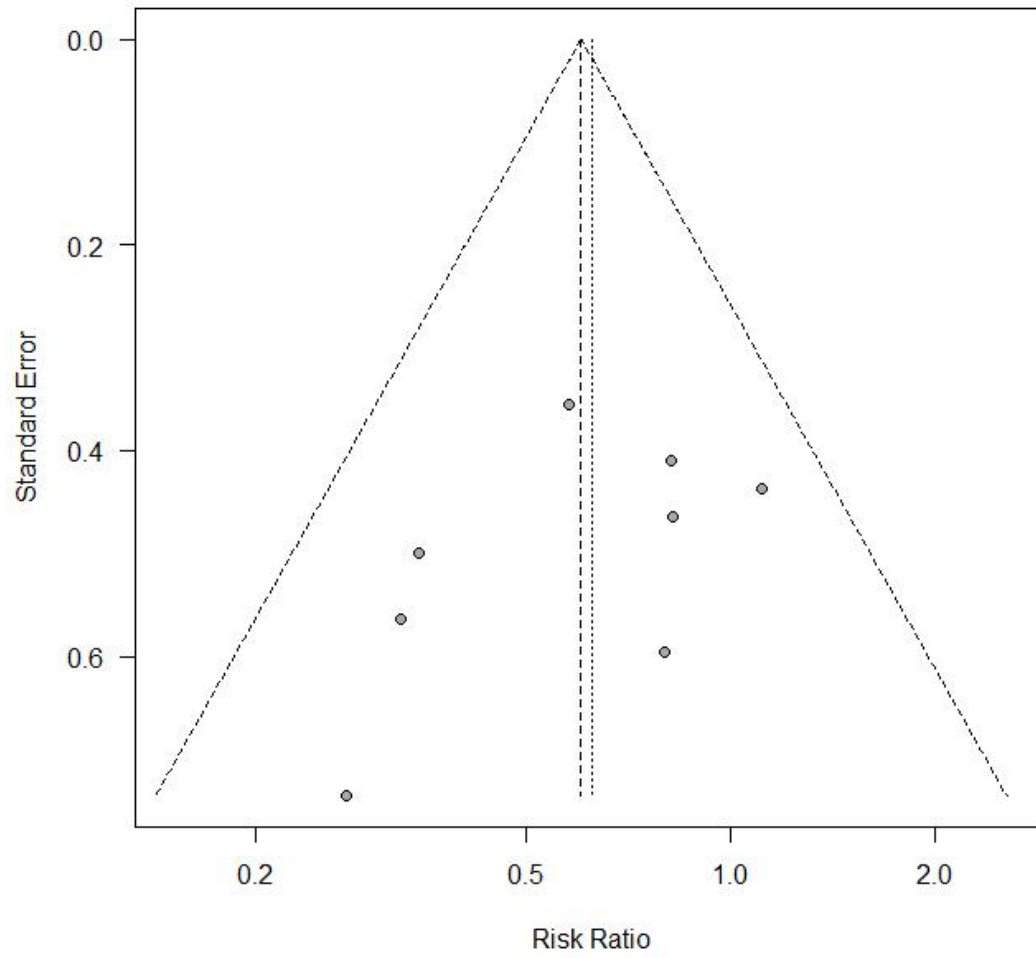
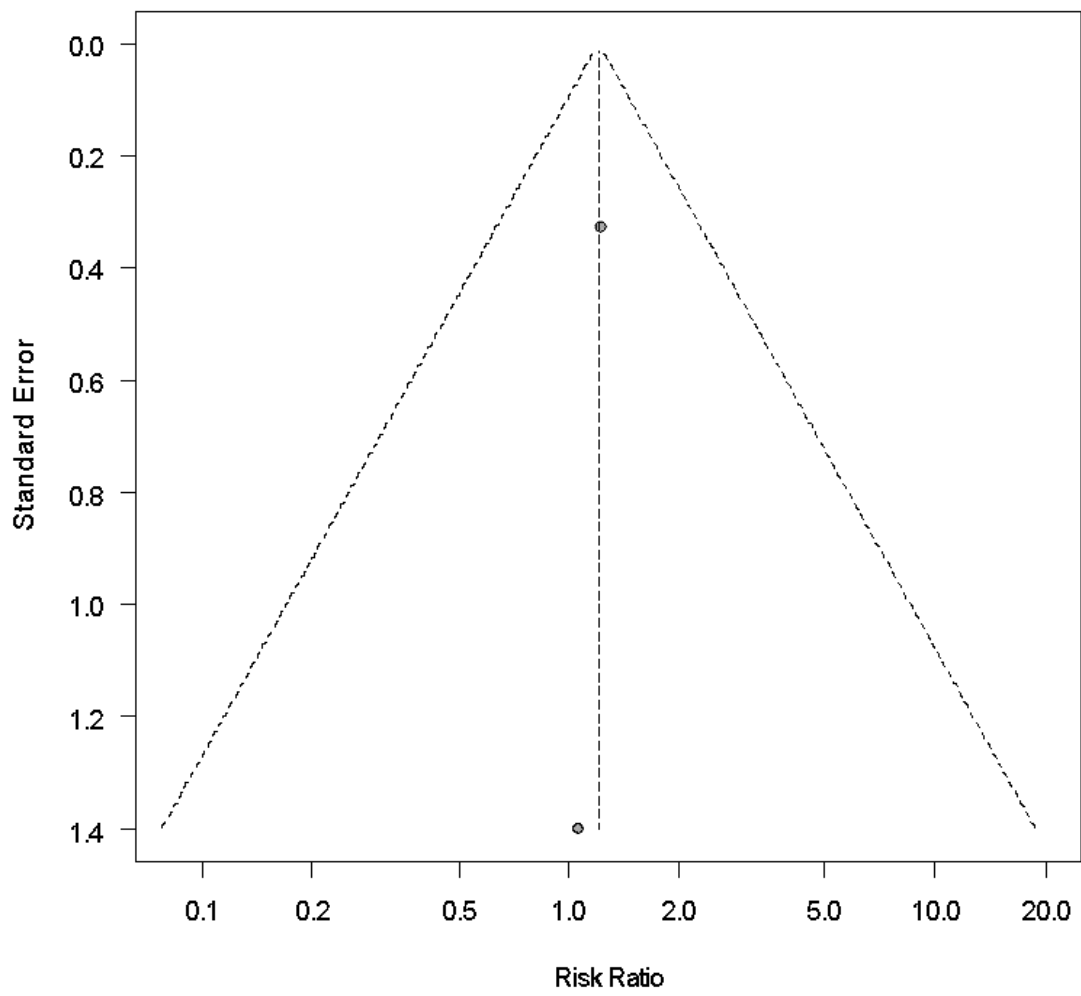


	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Arer [20] 2016	+	-	?	?	+	+	?
Baier [23] 2010	+	+	-	?	+	-	?
Kaya [11] 2010	+	+	-	?	-	-	?
Lauscher [21] 2016	-	-	+	+	+	?	?
Nakayama [19] 2014	+	+	-	?	+	+	?
Numata [24] 2014	?	?	-	?	-	+	?
Watanabe [26] 2017	+	?	-	-	-	+	?
Westphalen [25] 2015	+	+	-	?	+	+	?

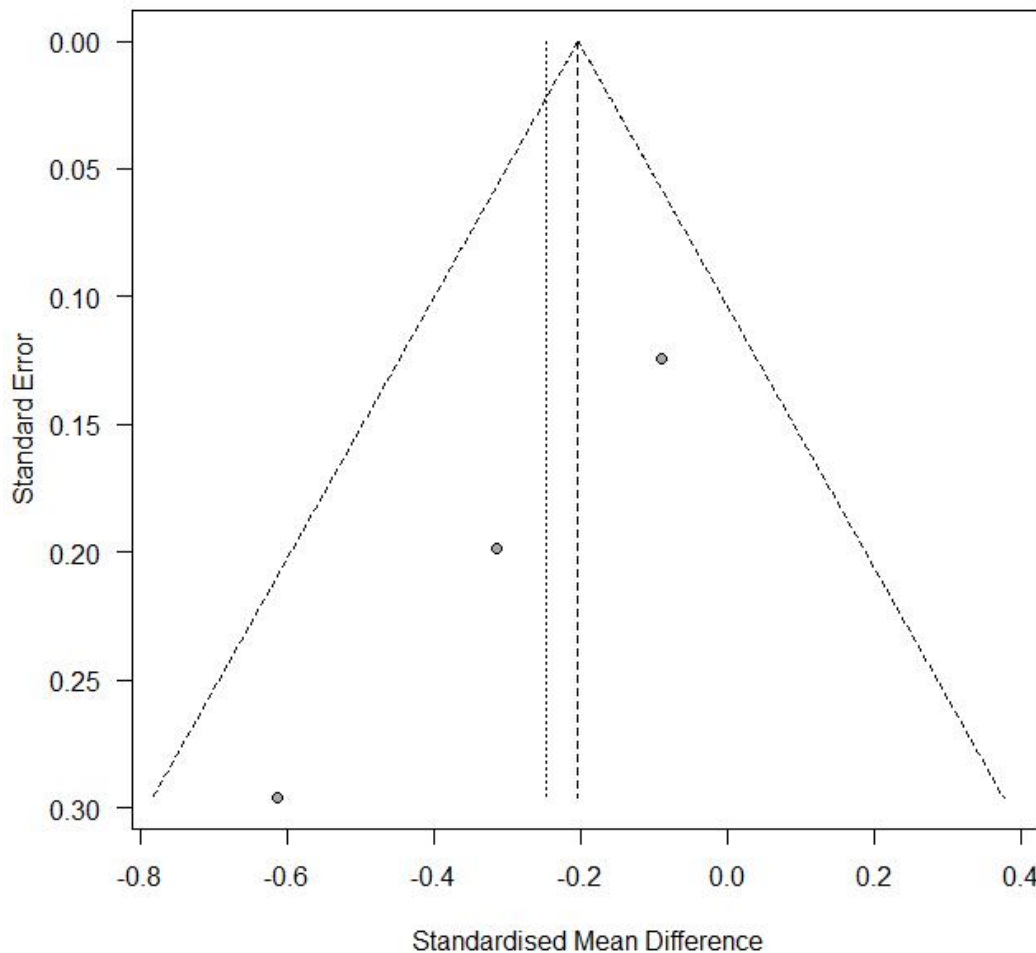
Supplementary Figure 1 Risk of bias in each study.



Supplementary Figure 2 Funnel plot of surgical site infections.



Supplementary Figure 3 Funnel plot of seroma formation.



Supplementary Figure 4 Funnel plot of hospital stays.

Supplementary Table 1 Search strategies

PubMed	Number
("surgery"[MeSH Subheading] OR "surgery"[All Fields] OR "surgical procedures, operative"[MeSH Terms] OR ("surgical"[All Fields] AND "procedures"[All Fields] AND "operative"[All Fields]) OR "operative surgical procedures"[All Fields] OR "general surgery"[MeSH Terms] OR ("general"[All Fields] AND "surgery"[All Fields]) OR "general surgery"[All Fields] OR "surgery s"[All Fields] OR "surgerys"[All Fields] OR	935

"surgeries"[All Fields]) AND ("subcutaneous"[All Fields] OR "subcutaneously"[All Fields] OR "subcutaneous"[All Fields]) AND ("drain"[All Fields] OR "drain s"[All Fields] OR "drained"[All Fields] OR "draining"[All Fields] OR "drains"[All Fields])

MEDLINE

Number

("surgery" OR ("surgical" AND "procedures" AND "operative") OR "operative surgical procedures" OR "general surgery" OR ("general" AND "surgery") OR "general surgery" OR "surgery s" OR "surgerys" OR "surgeries") AND (("subcutaneous" OR "subcutaneously" OR "subcutaneous") AND ("drain" OR "drain s" OR "drained" OR "draining" OR "drains"))

8,472

Cochrane Library

Number

("surgery" OR ("surgical" AND "procedures" AND "operative") OR "operative surgical procedures" OR "general surgery" OR ("general" AND "surgery") OR "general surgery" OR "surgery s" OR "surgerys" OR "surgeries") AND (("subcutaneous" OR "subcutaneously" OR "subcutaneous") AND ("drain" OR "drain s" OR "drained" OR "draining" OR "drains"))

55

Supplementary Table 2 Characteristics of each study

Author	Year	Surgery type	Drain type	Drain removal	Antibiotic prophylaxis	ITT
Baier ^[23]	2010	Upper GI, lower GI, HBP surgery	Redon drain (closed suction)	2nd POD	Cefuroxime and Metronidazole	Yes
Kaya ^[11]	2010	Upper GI, lower GI, HBP surgery	Hemovac drain (closed suction)	3rd POD	Cefazoline	No
Nakayama ^[19]	2014	HBP surgery	Blake drain (closed suction)	3rd POD	Cefazoline	Yes
Numata ^[24]	2014	Lower GI	Penrose drain (passive drainage)	3rd POD	Cefmetazole	No
Westphalen ^[25]	2015	Incisional hernia	Tubular drain	Drained	Cefazoline	Yes

	repair	(closed suction)	volume		
			≤40 ml/day		
Arer ^[20]	2016 Upper GI, lower GI, HBP surgery	ND (closed suction)	ND	ND	No
Lauscher ^[21]	2016 Lower GI	ND (closed suction)	2nd POD or 30 ml within 24 h	Ampicillin and Sulbactam	No
Watanabe ^[26]	2017 Lower GI	Blake drain (closed suction)	5th POD	Flomoxef	No

ITT: Intent to treat, GI: Gastrointestinal, HBP: Hepato-Biliary-Pancreatic, ND: Not described, POD: Postoperative day.