



## Review

# Intra-abdominal drainage after pancreatic resection: Is it really necessary? A meta-analysis of short-term outcomes



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## ABSTRACT

**Introduction:** Pancreatic fistula (PF) is the most dreadful complication of patients after pancreatic resection. The use of operative site drains is considered routine all along in pancreatic surgery in order to remove any collections and to act as a warning of hemorrhage or anastomotic leakage. To date few studies investigated the potential benefit and safety of routine drainage compared with no drainage after pancreatic resection and the evidence by literature is not clear.

**Methods:** A systematic review of the literature was carried out performing an unrestricted search in MEDLINE, EMBASE and Cochrane Library up to 28th February 2014. Reference lists of retrieved articles and review articles were manually searched for other relevant studies. The currently available data regarding the incidence of post-operative short-term outcomes after pancreatic resection were meta-analyzed according to the presence or absence of the intra-abdominal drainage.

**Results:** Overall 7 studies were included in the meta-analysis, that is 2 randomized controlled trials (RCTs) and 5 non-RCTs resulting in 2704 patients totally. Intra-abdominal drainage showed to increase the PF (OR 2.31, 95% CI 1.52–3.51), the total post-operative complications (OR 1.52, 95% CI 1.30–1.78) and the re-admission (OR 1.30, 95% CI 1.06–1.61) rates. A non-significant correlation was found with the presence/absence of the drainage about biliary and enteric fistula, post-operative hemorrhage, intra-abdominal infected collection, wound infection and overall mortality rates.

**Conclusion:** The meta-analysis shows that the presence of an intra-abdominal drainage does not improve the post-operative outcome after pancreatic resection.

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## 1. Introduction

Pancreatic surgery is burdened with high mortality (about 5%) and morbidity rates (about 50%) [1,2]. Pancreatic fistula (PF) is the most dreadful complication occurring to 4% up to 30% of patients after pancreaticoduodenectomy (PD), according to the definition

used; infectious complications occur in about 34% of PD and intra-abdominal abscess in 14% [1–3].

The use of operative site drains is considered routine all along in pancreatic surgery. Multiple catheters are placed in the right and left subhepatic space in relation to biliary and pancreatic anastomoses in order to remove any collections of blood and biliary, lymphatic or pancreatic secretions. They may also act as a warning of hemorrhage or anastomotic leakage. Indeed, the rationale for an intra-abdominal drainage is to allow a rapid evacuation of post-operative fluid collections, thus avoiding their infective contamination, and to early detect a dehiscence: all this may result in avoiding an additional surgical or percutaneous procedure.

Abbreviations: PF, pancreatic fistula; PD, pancreaticoduodenectomy; RCT, randomized controlled trial; POD, post-operative day.

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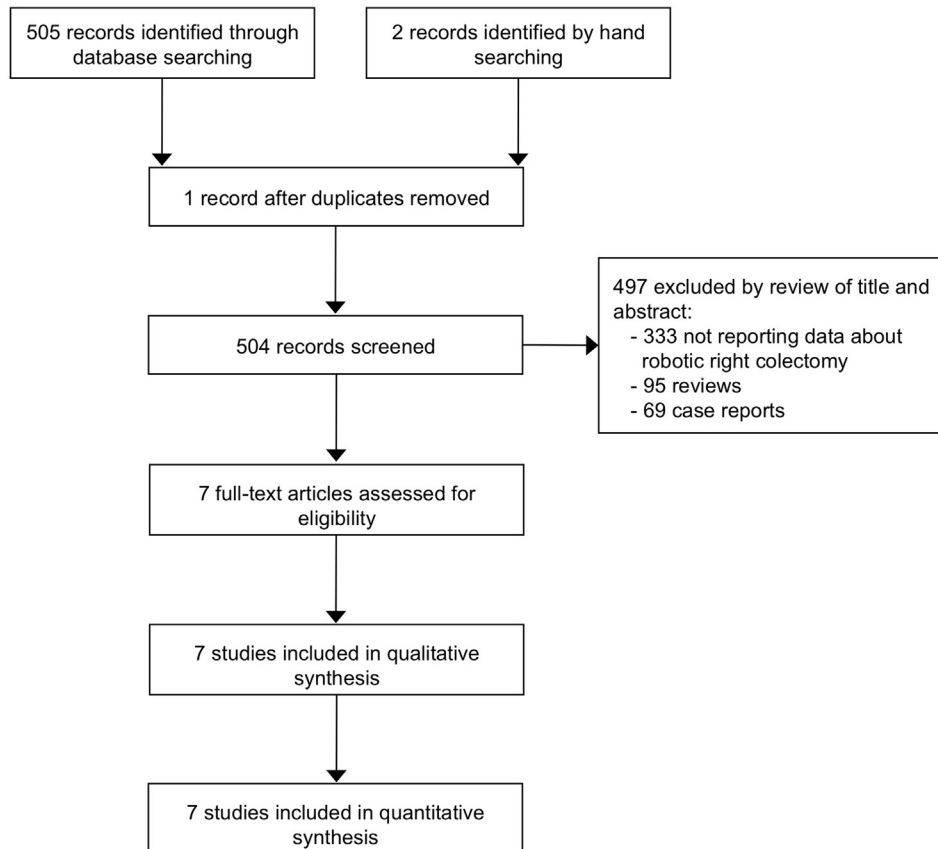


Fig. 1. Flow diagram of the retrieved studies.

Although for many years the routine placement of intra-abdominal drainage after surgery has been considered standard practice, over the last decade many authors have prompted to abandon this approach, supported by randomized controlled trials (RCTs) and meta-analyses that showed no benefit in the routine use of drainage following uncomplicated cholecystectomy [4], liver [5], gastric [6], and colorectal resections [7]. Moreover, the development of interventional radiologic techniques has allowed non-operative drainage of collections identified on ultrasonography or CT scan, therefore reducing the need for re-exploration in many cases.

The use of intra-abdominal drainage after pancreatic surgery is considered mandatory by the majority of surgeons around the world, because the complications due to PF may be life-threatening and the evidence by literature is not clear. To date only two RCTs about the potential benefit and safety of routine drainage compared with no drainage after pancreatic resection were published: one showed no benefit for intra-abdominal drainage after pancreatic resection [8], the other suggested that its elimination in PD increases the frequency and severity of complications [9].

A systematic review of the literature was carried out and the currently available data on the incidence of post-operative complications after pancreatic surgery were meta-analyzed, according to the presence or absence of the intra-abdominal drainage.

## 2. Materials and methods

A systematic review and a meta-analysis were performed about the benefit of intra-abdominal drainage in patients undergoing elective pancreatic surgery.

A protocol was prospectively developed, detailing the specific objectives, criteria for study selection, approach to assess study quality, outcomes and statistical methods.

### 2.1. Study outcomes

The primary outcomes of the study were the incidence of PF and the overall mortality in patients who underwent pancreatic resection with or without the placement of pelvic drainage. The secondary outcomes were the incidence of biliary fistula, enteric fistula, post-operative intra-abdominal hemorrhage, intra-abdominal infected collection, re-intervention and re-admission in the same population. The in-hospital follow-up was also considered.

### 2.2. Search strategy and eligibility criteria

An unrestricted search was performed in MEDLINE, EMBASE and Cochrane Library up to 28th February 2014. Research criteria included the terms “pancreas resection”, “pancreatic resection”, “pancreatic surgery” and “drainage”. Furthermore, reference lists of retrieved articles and review articles were searched manually for other relevant studies.

Two authors (RF and DM) independently performed the searches and reviewed all identified publications and abstracts for inclusion by using predetermined criteria. In order to be comprised in this review, studies needed to be reported on patients including what follows: number of patients drained and not drained, type of drainage used, incidence of PF in the two subgroups of patients. Disagreements were resolved by consensus with a third investigator (BW) and by means of discussion. The flow diagram of the retrieved, selected and excluded publications is reported in Fig. 1.

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