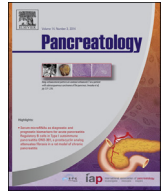




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Original article

Duodenum-preserving total and partial pancreatic head resection for benign tumors – Systematic review and meta-analysis

Hans G. Beger^{a, d, *}, Akimasa Nakao^b, Benjamin Mayer^c, Bertram Poch^d^a Department of General and Visceral Surgery, University of Ulm, Germany^b Nagoya Central Hospital, Nagoya University, Japan^c Department of Epidemiology and Medical Biometry, University of Ulm, Germany^d Center of Oncologic, Endocrine and Minimal Invasive Surgery, Donauklinikum Neu-Ulm, Germany

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ABSTRACT

Background: Potential benefits of local extirpation of benign pancreatic head tumors are tissue conservation of pancreas, stomach, duodenum and common bile duct (CBD) and maintenance of pancreatic functions.

Methods: Medline/PubMed, Embase and Cochrane Library databases were searched to identify studies applying duodenum-preserving total or partial pancreatic-head resection (DPPHRt/p) and reporting short- and long-term outcomes. Twenty-four studies, including 416 patients who underwent DPPHRt/p, were identified for systematic analysis. The meta-analysis was based on 10 prospective controlled and 4 retrospective controlled cohort studies, comparing 293 DPPHRt/p resections with 372 pancreato-duodenectomies (PD).

Results, systematic analysis: Of 416 patients, 75.7% underwent total and 24.3% partial head resection, while 47.1% included segmentectomy of duodenum and CBD. *The most common pathology was cystic neoplasm (65.8%) and endocrine tumors (13.4%).* The frequencies of severe postoperative complications of 8.8%, pancreatic fistula of 19.2%, re-operation of 1.7% and hospital mortality of 0.48%, indicate a low level of early post-operative complications.

Meta-analysis: DPPHRt/p significantly preserved the level of exocrine (IV = -0.67, 95% CI -0.98 to -0.35, p = 0.0001) and endocrine (IV = 18.20, fixed, 95% CI -0.92 to 25.48, p = 0.0001) pancreatic functions compared to PD when the pre- and postoperative functional status in both groups are analyzed.

There were no significant differences between DPPHRt/p and PD in frequency of pancreatic fistula, delayed gastric emptying or hospital mortality.

Conclusion: DPPHRt/p for benign neoplasms and neuro-endocrine tumors of the pancreatic head is associated with a low level of early-postoperative complications and a *better* conservation of exocrine and endocrine functions.

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Introduction

The most frequent pancreatic benign lesions are cystic neoplasms and neuro-endocrine tumors, detected in 2–3% of the adult population using the standardized application of high-resolution imaging techniques [1,2]. Benign tumorous lesions are increasingly detected fortuitously in asymptomatic patients [2]. Partial pancreato-duodenectomy (PD) is currently the standard treatment for benign tumors of the pancreatic head [3]. However, resecting

the pancreatic head, lower stomach, duodenum, distal common bile duct (CBD) and gall bladder, for a local benign lesion, challenges the surgeons' decision-making because of the unnecessary sacrifice of functional pancreatic and extra-pancreatic tissues. Limited organ-preserving operative techniques – tumor enucleation, central pancreatectomy and duodenum-preserving total or partial pancreatic-head resection (DPPHRt/p) with or without segmental duodenectomy – have been applied in recent years to treat benign pancreatic neoplastic lesions. These local surgical procedures may have the potential to reduce tissue trauma in tumor patients, resulting in low postoperative morbidity and conservation of pancreatic functions.

* Corresponding author. C/o Universitätsklinikum Ulm, Albert-Einstein-Allee 23, 89081 Ulm, Germany. Tel.: +49 (731)71576 101; fax: +49 (731)71576 255.

E-mail address: hans@beger-ulm.de (H.G. Beger).

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Duodenum-preserving pancreatic-head resection (DPPHR) is a standardized surgical technique proven by controlled clinical trials and meta-analyses, which is applied as a limited subtotal head resection for patients suffering benign inflammatory tumors of the pancreatic head [4–10].

After the establishment of duodenum-preserving total pancreatic head resection with or without segmental resection of the peripapillary duodenum and the intra-pancreatic segment of the CBD for benign neoplasms, this tissue-sparing procedure gained increasing acceptance among surgeons [11,12]. The aim of the present systematic review and meta-analysis was to evaluate the level of evidence regarding surgery-related postoperative outcome and functional changes after duodenum-preserving total (DPPHRT) and partial (DPPHRp) pancreatic-head resection for benign tumors in the literature, comparing DPPHRT/p with PD.

Material and methods

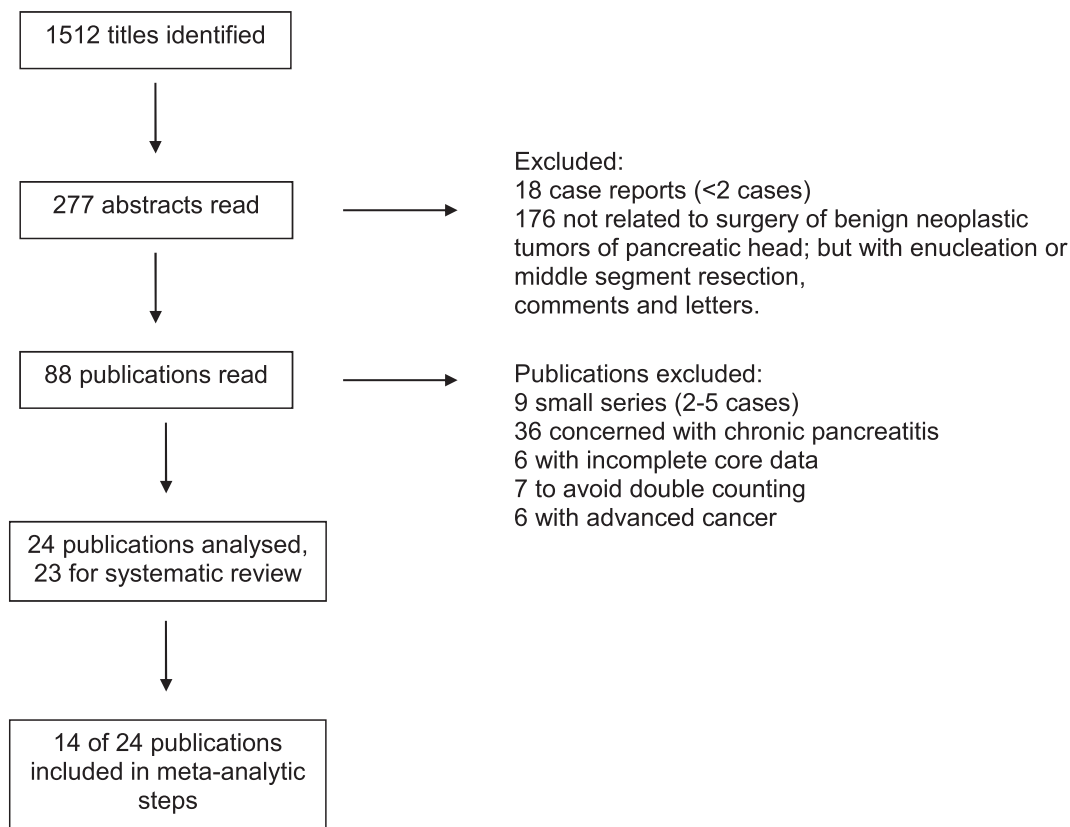
Search strategy

An extensive literature search was performed using the electronic data network of PubMed/Medline, Embase and the Cochrane

Library. The PRISMA statement for reporting systematic reviews and meta-analyses of studies was applied [13]. PubMed/Medline and the Cochrane library were searched for medical subject headings (MeSH-terms) and Embase using Emtree-terms. In addition, a text word search for pancreatic-head resection techniques was applied. The search results to identify relevant publications are presented in Fig. 1. No restrictions were primarily applied to the search with regard to the number of cases reported, type of publication and assessment of clinical features [14–16]. A total of 1512 titles were identified in the first step, of which 277 abstracts were read (Fig. 1).

Criteria for inclusion and exclusion

Of the 277 abstracts, 18 case reports, 131 publications on clinical aspects, diagnosis and pathomorphology, 32 abstracts reporting enucleation or pancreatic middle-segment resection and 8 comments and letters were excluded. Thus 88 full papers remained to be read, from which the case publications, small patients series (2–5 patients), reports including > 15% of the total cases with chronic pancreatitis and publications with incomplete core data were excluded. Reports were classified as cohort studies according



Search items and results:

* Duodenum-preserving head resection	302
Organ preserving pancreatic head resection	69
Segmental resection of the pancreas	146
Inferior pancreatic head resection	62
Duodenum-preserving pancreatic head resection	284
Pancreatic head resection with segmental duodenectomy	15
Limited pancreatic head resection	634
Uncinatus resection/uncinectomy	0

Fig. 1. Data allocation process.

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