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Short Report

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Short Report

Standardizing definitions and terminology of left-sided pancreatic resections through an international Delphi consensus

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Introduction

Distal pancreatectomy (DP), introduced in the late 19th century[1], has gone through significant changes over time as a result of the increased knowledge of pancreatic anatomy, physiology, and biology of pancreatic neoplasms, and has become a routine procedure to treat pancreatic body and tail diseases. DP can be performed for a wide range of indications and therefore includes different types of resection. For benign disease, a more organ-sparing resection can be performed by dividing the pancreas left from the portal–mesenteric axis, to spare parenchyma and reduce the patient's risk of developing diabetes and exocrine insufficiency[2]. For malignant disease, a more extensive resection is required to ensure oncological radicality using a radical antegrade modular pancreatosplenectomy[3] or a radical no-touch left pancreatosplenectomy[4]. Although many approaches and techniques have been described and practised around the world, many surgeons continue to use 'DP' as an overarching term to indicate a heterogeneous group of left-sided pancreatic surgical procedures.

Without a clear distinction between these procedures, one will continue to base understanding and research on inaccurate data, referring to a mixed group of procedures with varying technical difficulties and outcomes. During the Brescia Internationally Validated European Guidelines on Minimally Invasive Pancreatic Surgery (EGUMIPS) meeting[5], participating experts emphasized the need for standardized definitions of the different types of DP. Therefore, a new set of terminology for left-sided pancreatic resections has been developed through a Delphi survey among experts in the field of pancreatic surgery.

Methods

This was a prospective Delphi consensus study[6,7] and was initiated during the EGUMIPS meeting. All experts who participated in the EGUMIPS meeting and expert representatives from hepatopancreatobiliary mother societies were invited. All invited experts were recognized international surgeons in minimally invasive and open pancreatic surgery. Additionally, five pancreatic radiologists were invited considering their important role in preoperative assessment and anatomical definition. Based on the comments of experts, four starting proposals including different definitions and categories of left-sided pancreatic resections were developed (*Fig. S1a–d*), and underwent iterative ranking and modification in subsequent Delphi rounds. Participants voted on the most suitable proposals, with further optimization in each round (*Figs S2a–c* and *S3a,b*). The threshold for consensus on the final proposal was set at 70% or more agreement, which has been used in previous Delphi consensus studies[8–10]. Additional methodological details are available in the *Supplementary material*.

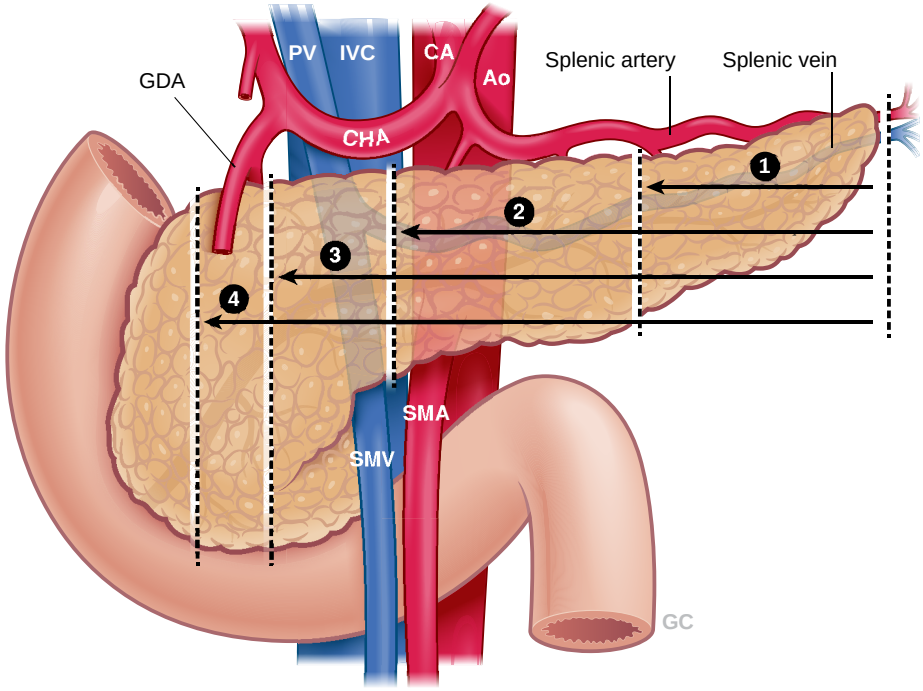
Results

In total, 86 experts from 24 countries spanning four continents were invited to participate in the Delphi process. Of these, 71 (83%) participated in round 1, 74 (86%) in round 2, and 72 (84%) in round 3. The participating experts are listed in *Table S1*.

Final proposal

After three Delphi rounds, consensus was achieved on the final proposal by 78% of the respondents. Details of the voting

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1	Pancreatic tail resection – to half the distance between the pancreatic tail edge and the SMV
2	Pancreatic body and tail resection – to the left border of the SMV
3	Pancreatic neck, body and tail resection – to the left border of the GDA
4	Extended pancreatic neck, body and tail resection – to the right of the GDA

Fig. 1 Final proposal with definitions of left-sided pancreatic resections that reached 77.8% consensus among the experts

Ao, aorta; CA, celiac artery; CHA, common hepatic artery; GDA, gastroduodenal artery; IVC, inferior vena cava; PV, portal vein; SMA, superior mesenteric artery; SMV, superior mesenteric vein.

process are available in the *Supplementary material* and in *Fig. S4*. The final proposal included four resection categories based on anatomical borders (*Fig. 1*):

- pancreatic tail resection—resection at less than half of the distance between the pancreatic tail edge and the left border of the SMV
- pancreatic body and tail resection—resection to the left border of the SMV (more than half the distance between pancreatic tail edge and the left border of the SMV)
- pancreatic neck, body, and tail resection—resection between the SMV and the left border of the gastroduodenal artery
- extended pancreatic neck, body, and tail resection—resection to the right of the gastroduodenal artery.

Additions and abbreviations

The different resection categories should be further specified based on the additional procedures or type of technique performed. The following additions and abbreviations should be added to the resection category (*Fig. 2*):

- surgical approach: ^{O}, open; ^{L}, laparoscopic; ^{R}, robotic; $^{L\rightarrow O}$ and $^{R\rightarrow O}$ in the event of conversion from a laparoscopic and robotic procedure respectively
- if splenectomy: S+
- if splenic vessel resection in a spleen-preserving procedure: V+
- if multivisceral resection (other than spleen, according to International Study Group for Pancreatic Surgery definition of extended resections)[11]: MV(organ)
- if resection of Gerota's fascia: G+.

Examples of the application of the terminology to clinical scenarios are provided in the *Supplementary material*.

Discussion

In this study, new terminology for different types of left-sided pancreatic resection has been suggested by a large group of experts in the field of pancreatic surgery through a Delphi consensus process. Traditional DP refers to a heterogeneous group of left-sided pancreatic resections, whereas this new terminology distinguishes between the different types, with the

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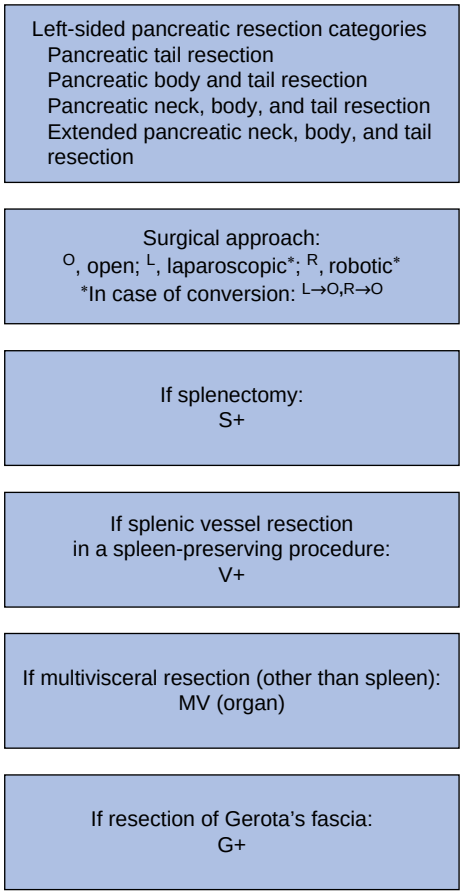


Fig. 2 Overview of left-sided pancreatic resection categories and additions with abbreviations to specify the procedure

aim of enabling better surgical reporting, understanding, and comparison.

In response to the varied terminology in pancreatic surgery, the 2016 'State of the Art Conference on Minimally Invasive Pancreatic Resection' aimed to standardize terminology[12]. It was concluded that 'distal (or left-sided) pancreatectomy' is the correct generic name for any type of resection of the pancreas to the left of the SMV, irrespective of spleen preservation or splenic vessel resection. However, distinctions between these resections still exist, and they all have their own different clinical consequences. The term DP alone does not accurately differentiate among these procedures. A DP up to the border or to the right of the SMV entails the removal of a larger amount of pancreatic parenchyma and a higher level of technical complexity, whereas a DP in which only 3 cm of the pancreatic tail is resected poses a much lower risk of complications and a lower risk of developing postoperative diabetes[2]. Yet in the current terminology, both are called DP. With the proposed new terminology, this issue is addressed by subdividing DP into more detailed subcategories and providing more clarity on the location and extent of resection. In addition, despite DP being used for years, it is questionable whether it is an appropriate term. According to a previous publication of the Terminology Committee of the International Hepato-Pancreato-Biliary Association, definitions should be based, among other things, on correct anatomical patterns[13]. Anatomically, the current proximal part of the pancreas could actually be considered the distal part of the pancreas, given the way the pancreatic duct drains its fluid. The new terminology eliminates the ongoing confusion in this regard and is therefore more applicable.

The new terminology focuses primarily on the type of resection. Additional details, including surgical approach (open, laparoscopic or robotic) or additional resections (for example, multivisceral or spleen) are incorporated with abbreviations to specify procedures. These specifications are essential for surgical reporting, as they affect outcomes irrespective of the type of resection. Although some rare procedures related to left-sided pancreatic resections are omitted owing to their rarity, the current additions and abbreviations aim to enhance practical applicability, providing concise and easily translatable information for standardized surgical reporting and understanding.

This study has some limitations. First, a large number of experts around the world could not be included. However, the largest possible number of experts was included in this consensus, without confusing the process and distracting attention from the main purpose of the study. At the same time, a good representation from different societies, consortia, and continents was taken into account. Second, leaving the definition of pancreatic body and tail or pancreatic tail resection to the surgeon evaluation may be perceived as a less precise option; however, in the absence of an appropriate anatomical landmark, this was the most feasible solution agreed upon by the experts.

Author contributions

Tess M.E. van Ramshorst (Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing—original draft), Jony van Hilst (Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing—orginal draft), Marc G. Besselink (Conceptualization, Data curation, Writing—Review & Editing, Supervision), Mohammad Abu Hilal (Conceptualization, Data curation, Methodology, Writing—Review & Editing, Visualization, Supervision), all other authors (Conceptualization, Data curation, Writing—Review & Editing).

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Disclosure

The authors declare no conflict of interest.

Supplementary material

Supplementary material is available at *BJS* online.

Data availability

The data, analytical methods, and study materials will be available upon reasonable request.

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