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From ERPANDIS to SPANDISPAN: Two Decades of Collaborative Research in Left Pancreatectomy

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Abstract

The development of collaborative clinical registries has profoundly transformed pancreatic surgery research over the past two decades. While traditional evidence was largely derived from single-center retrospective studies and administrative databases, prospective, clinician-led registries have generated high-quality evidence and facilitated benchmarking, quality assessment, and continuous improvement in surgical care.

The Dutch Pancreatic Cancer Group pioneered this model by establishing nationwide prospective audits that produced hundreds of scientific publications and fundamentally shaped pancreatic surgery research across Europe. Inspired by this collaborative philosophy, several national and international initiatives subsequently emerged, including the Spanish projects ERPANDIS (Estudio Retrospectivo PANcreatectomía DIStal) and SPANDISPAN (SPANish DIStal PANcreatectomy)

ERPANDIS represented the first multicenter collaborative (8 centers) effort focused specifically on left

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pancreatectomy in Spain. The experience gained through this retrospective registry ultimately led to the development of SPANDISPAN, a nationwide prospective project involving 41 centers and representing approximately three-quarters of all left pancreatectomies performed annually in Spain.

Together, ERPANDIS and SPANDISPAN generated evidence on multivisceral resection, mucinous cystic neoplasms, delayed gastric emptying, textbook outcome, splenic vessel involvement, benchmarking, institutional volume, failure-to-rescue, postpancreatectomy hemorrhage, conversion during minimally invasive surgery, and extended left pancreatectomy.

This article reviews the evolution of both projects, summarizes their key scientific contributions, discusses lessons learned from two decades of collaborative research, and explores how similar initiatives may help develop pancreatic surgery networks in Southeastern Europe.

Keywords: left pancreatectomy, pancreas, registry, outcomes, textbook outcome, failure to rescue, surgery

1. Why Surgical Registries Matter

Over the past two decades, surgical research has evolved from isolated institutional experiences to collaborative prospective data collection. Historically, much of the available evidence in surgery came from single-center retrospective series, often limited by small sample sizes, selection bias, and heterogeneous data collection. At the same time, large administrative databases, particularly in the United States, provided important insights into surgical outcomes and healthcare delivery. Resources such as NSQIP, SEER, NCDB, and Medicare-derived datasets substantially improved our understanding of quality assessment and population-level outcomes[1,2].

Nevertheless, administrative databases are typically designed for billing, epidemiological surveillance, or healthcare management rather than for answering specific clinical questions. Consequently, they often lack the granularity needed to evaluate procedure-specific outcomes and the technical aspects of complex operations[1,2]. Variables related to postoperative pancreatic fistula, benchmarking, textbook outcome, failure-to-rescue, or minimally invasive pancreatic surgery are frequently unavailable or incompletely captured.

Clinician-led registries emerged to address these limitations. Unlike administrative datasets, registries are designed and governed by healthcare professionals who determine which variables to collect, how outcomes should be defined, and which quality indicators to evaluate[1,2]. This approach enables detailed assessment of clinically relevant endpoints while also creating platforms for quality improvement, benchmarking, and collaborative research.

Perhaps the most influential example in pancreatic surgery is the Dutch Pancreatic Cancer Group (DPCG). Through the Dutch Pancreatic Cancer Audit, this collaborative network demonstrated that nationwide prospective registries could improve patient care, facilitate benchmarking, and generate high-impact scientific research. Under the leadership of Prof. Marc Besselink, the DPCG became one of the most influential collaborative pancreatic surgery networks worldwide[3]. More importantly, it established a culture of collaboration, transparency, and continuous quality improvement that has become a model for pancreatic surgery research across Europe[4].

The influence of the Dutch experience rapidly extended beyond the Netherlands. Similar registry-based initiatives subsequently emerged in France, Germany, Sweden, the United Kingdom, and other European countries. International collaborative projects such as the European Consortium on Minimally Invasive Pancreatic Surgery (E-MIPS) further expanded the concept of prospective registry-based research across national borders[5]. These initiatives demonstrated that registries could serve not only as scientific tools but also as mechanisms for auditing clinical practice, monitoring outcomes, promoting standardization, and fostering academic collaboration.

Perhaps the most important lesson derived from these experiences is that meaningful clinical research does not necessarily require large financial investments or sophisticated infrastructures. Instead, it requires motivated clinicians, standardized definitions, reliable data collection, and a shared willingness to learn from collective experience[6,7].

It was within this international movement toward collaborative registry-based pancreatic surgery research that the Spanish projects ERPANDIS (Estudio Retrospectivo PANcreatectomia DIStal) and SPANDISPAN (SPANish DIStal PANcreatecomy) were conceived.

2. ERPANDIS: The Foundation of Collaborative Research in Left Pancreatectomy

The intellectual origins of ERPANDIS trace back to a simple observation that remains relevant today: left

pancreatectomy (LP) is often viewed as less demanding than pancreatoduodenectomy, even though it is performed for a remarkably heterogeneous group of diseases. Years before multicenter registries became common in pancreatic surgery; this concept was captured in a Spanish publication that described LP as "one operation for many indications."[8]

LP is performed for a wide spectrum of pathological entities, including pancreatic ductal adenocarcinoma, neuroendocrine tumors, mucinous cystic neoplasms, intraductal papillary mucinous neoplasms, solid pseudopapillary tumors, metastatic lesions, and benign conditions. Although the technical procedure may appear similar, these diseases differ substantially in biological behavior, prognosis, operative complexity, and expected outcomes.

When ERPANDIS was conceived, Spain lacked a collaborative registry specifically focused on LP. Most of the available evidence came from single-center retrospective series that were often underpowered to address clinically relevant questions. To overcome these limitations, a multicenter initiative involving eight pancreatic surgery units from Spain and Puerto Rico was launched. With the invaluable organizational support of Mario Serradilla, the ERPANDIS registry was created to combine institutional experiences into a sufficiently large cohort capable of addressing questions that could not be adequately explored by individual centers alone.

The scientific productivity of ERPANDIS exceeded initial expectations[9-13]. Over the following years, the registry produced a series of studies addressing several aspects of LP, including multivisceral resection, mucinous cystic neoplasms, delayed gastric emptying, textbook outcome, and radiologic splenic vessel involvement[9-13]. Although each project addressed a different clinical question, common themes gradually emerged.

The first studies examined how disease-specific and technical factors influence outcomes. The analysis of multivisceral resection showed that increased operative complexity does not necessarily preclude acceptable outcomes when careful patient selection is applied[9]. Similarly, the study of mucinous cystic neoplasms underscored the importance of pathological heterogeneity and reinforced the concept that LP should not be considered a uniform procedure[10].

Subsequent investigations focused on quality assessment and postoperative recovery. The delayed gastric emptying study showed that this complication is not limited to pancreatoduodenectomy and may significantly affect recovery after LP, particularly when associated with a postoperative pancreatic fistula[11]. The textbook outcome analysis further broadened the concept of surgical quality by emphasizing that optimal care cannot be adequately assessed by morbidity and mortality alone[12].

Finally, the study evaluating radiologic splenic vessel involvement examined the relationship between preoperative imaging findings and oncologic outcomes. The results suggested that radiologic data may provide valuable information about disease aggressiveness and contribute to preoperative risk stratification[13].

Perhaps the most important achievement of ERPANDIS was not any individual publication but rather the demonstration that collaborative research focused exclusively on LP was feasible and scientifically productive. The registry fostered cooperation among pancreatic surgeons, established a national network capable of generating meaningful evidence, and laid the foundation for future prospective initiatives.

As ERPANDIS evolved, pancreatic surgery itself was changing. Minimally invasive LP became increasingly established, laparoscopic approaches were progressively adopted throughout Spain, and robotic surgery began expanding into specialized pancreatic units. Simultaneously, concepts such as benchmarking, textbook outcome, and failure-to-rescue were gaining prominence within the international pancreatic surgery community. These developments highlighted the limitations of retrospective data collection and underscored the need for a prospective nationwide registry to evaluate contemporary practice.

3. SPANDISPAN: The Evolution of Prospective Collaborative Research

The natural consequence of these developments was SPANDISPAN.

The experience gained through ERPANDIS demonstrated that collaborative research focused on LP was both feasible and scientifically productive. However, it also highlighted the inherent limitations of retrospective studies, including incomplete data collection, heterogeneity across participating institutions, and the inability to evaluate emerging concepts prospectively.

At the same time, as we previously mentioned, pancreatic surgery itself was undergoing a profound transformation. Minimally invasive LP was increasingly adopted throughout Spain, laparoscopic approaches were

progressively replacing traditional open surgery, and robotic platforms were beginning to gain acceptance in specialized pancreatic units.

These developments created the ideal environment for a new collaborative initiative. Under the leadership of Cándido Alcázar and with support from pancreatic surgeons nationwide, the SPANDISPAN project was established as a prospective nationwide registry dedicated to LP.

The project ultimately involved 41 participating centers and captured approximately 75% of all LP performed annually in Spain. To our knowledge, SPANDISPAN is one of the largest prospective national registries exclusively focused on LP. Beyond its scientific productivity, the project created a collaborative network capable of evaluating contemporary surgical practice, identifying opportunities for quality improvement, and generating evidence relevant to everyday clinical decision-making.

Unlike ERPANDIS, which primarily sought to demonstrate the feasibility of multicenter collaborative research, SPANDISPAN was conceived as a mature prospective platform designed to address increasingly sophisticated clinical questions. The resulting studies examined not only perioperative outcomes but also benchmarking, institutional performance, complication management, and the impact of biological and technical factors on surgical outcomes.

Taken together, these analyses provide a comprehensive overview of contemporary LP and constitute the most extensive body of evidence from a national prospective registry dedicated to this procedure.

3.1 Understanding Outcomes After Left Pancreatectomy

The first studies generated by SPANDISPAN sought to define contemporary outcomes after LP and identify the factors that influence surgical results. Beyond describing morbidity and mortality, these analyses aimed to establish standards of excellence and to understand how disease-specific characteristics influence perioperative outcomes[14-16].

- Benchmarking Excellence: Defining the Best Achievable Outcomes

Benchmarking has become one of the most important concepts in contemporary surgical quality assessment[6]. Unlike traditional outcome reporting, which describes average performance, benchmarking identifies the best achievable results under optimal conditions. By establishing reference values from high-performing centers and low-risk patients, benchmarking provides objective standards for institutions to compare their performance[6].

Using data from the SPANDISPAN registry, the benchmark study evaluated outcomes after LP in a contemporary national cohort[14]. The analysis showed that even in ideal circumstances, LP remains associated with substantial morbidity. Clinically relevant postoperative pancreatic fistula, major complications, and prolonged hospital stay could not be eliminated, underscoring the intrinsic complexity of pancreatic surgery.

Perhaps the most important contribution of this study was the establishment of objective benchmark values for LP in a national setting. These values provide realistic expectations for surgeons, institutions, and patients while identifying areas where quality improvement efforts may be directed.

The study also reinforced an important conceptual message. Benchmarking should not be interpreted as a description of average outcomes but rather as a representation of what can reasonably be achieved under optimal conditions. Consequently, benchmark values offer a more meaningful framework for quality assessment than simple comparisons between institutions.

Ultimately, the benchmark analysis demonstrated that excellence in LP is measurable, but also that even the best achievable outcomes remain associated with significant morbidity. This finding serves as a reminder that LP should continue to be regarded as a major pancreatic operation requiring specialized expertise and multidisciplinary care.

- Contemporary Left Pancreatectomy in Spain

While benchmarking defines excellence, understanding contemporary practice requires evaluating outcomes across the entire spectrum of patients and institutions. For this reason, one of the first objectives of SPANDISPAN was to provide a national snapshot of LP in Spain[15]. The analysis demonstrated the remarkable evolution since ERPANDIS's early years. Minimally invasive surgery has become the dominant approach.

Despite these technological advances, postoperative morbidity remained substantial. Complications continued to affect a considerable proportion of patients, and postoperative pancreatic fistula remained the most important determinant of adverse outcomes. However, mortality rates were exceptionally low, underscoring the

considerable improvements achieved in perioperative management, complication recognition, and multidisciplinary postoperative care.

Perhaps the most important message of this study was that modern LP has become safer without being simpler. Technological innovation and minimally invasive surgery have improved perioperative outcomes, but they have not eliminated the inherent challenges of pancreatic resection.

Consequently, the study provided a realistic portrait of contemporary LP in Spain: a procedure increasingly performed using minimally invasive approaches, associated with low mortality yet still marked by significant morbidity and substantial postoperative complexity.

- One Operation for Many Diseases Revisited

One of the original concepts underpinning ERPANDIS was that LP is a single operation performed for multiple diseases. The histology analysis from SPANDISPAN revisited this idea using prospective nationwide data.

The study evaluated postoperative outcomes by underlying pathological diagnosis and found significant differences among disease groups. Patients undergoing surgery for pancreatic ductal adenocarcinoma, neuroendocrine tumors, mucinous cystic neoplasms, and other pancreatic lesions showed distinct clinical characteristics, intraoperative findings, and postoperative outcomes[16].

These observations underscored the importance of accounting for pathological heterogeneity when interpreting surgical results. Comparisons across institutions, studies, and surgical approaches may be misleading if underlying disease distributions are not considered. What appears to be a difference in surgical quality may instead reflect differences in patient selection and disease biology.

Perhaps the most important contribution of this study was confirming that LP should not be viewed as a homogeneous procedure. Rather, it is a common technical operation performed across diseases with profoundly different biological behaviors and clinical trajectories.

The findings therefore validated one of the central ideas that had originally inspired ERPANDIS and demonstrated that the concept remains equally relevant in the era of prospective national registries.

3.2 Understanding Quality and Institutional Performance

While the first SPANDISPAN studies focused primarily on patient characteristics and disease-related factors, subsequent analyses addressed a different question: why do some institutions consistently achieve better outcomes than others?

- Does Volume Matter? The Relationship Between Institutional Experience and Outcomes

The relationship between hospital volume and surgical outcomes has been among the most debated topics in complex gastrointestinal surgery. For pancreatic resections, numerous studies have suggested that higher procedural volumes are associated with improved outcomes, prompting many healthcare systems to promote varying degrees of centralization[3]. Nevertheless, data specifically focused on LP remain limited.

Using the SPANDISPAN cohort, this study evaluated the influence of institutional volume on perioperative outcomes after LP[17]. The analysis demonstrated significant differences among centers by annual procedural volume. Higher-volume institutions were more likely to adopt minimally invasive approaches, accumulate greater experience in managing complex pancreatic disease, and achieve superior perioperative outcomes overall.

Importantly, the study suggested that volume functions not merely as a numerical indicator but as a surrogate for institutional expertise. High-volume centers typically benefit from dedicated multidisciplinary teams, standardized perioperative pathways, experienced interventional radiology services, and greater familiarity with postoperative complication management. These factors collectively contribute to improved patient care and may help explain part of the observed volume-outcome relationship.

The principal contribution of this study was the confirmation that institutional experience remains an important determinant of outcomes after LP. While volume alone cannot guarantee excellence, the findings support the concept that complex pancreatic surgery benefits from concentration of expertise and from organizational structures capable of delivering highly specialized care.

- Failure to Rescue: Beyond the Prevention of Complications

Traditionally, surgical quality has been assessed using complication rates, mortality, and length of hospital stay. However, contemporary quality research increasingly recognizes that complications are not always entirely preventable. Equally important is how effectively institutions manage serious complications once they occur. This concept, known as failure to rescue (FTR),

has emerged as one of the most informative indicators of healthcare quality[18,19].

The SPANDISPAN FTR study examined outcomes among patients who developed major postoperative complications after LP[20]. Rather than focusing exclusively on complication rates, the analysis examined which patients ultimately died after severe adverse events and which factors influenced successful rescue.

The findings showed that mortality after LP is often determined less by the occurrence of complications than by an institution's ability to recognize, escalate, and manage them appropriately. Patient-related factors such as age and disease complexity contributed to risk, but institutional resources and multidisciplinary expertise also appeared to play a crucial role.

These observations reinforce an important concept in modern surgical quality assessment: excellent care is defined not only by avoiding complications but also by responding effectively when they occur. Consequently, FTR complements traditional outcome measures and offers a more comprehensive view of institutional performance.

Perhaps the most important message of this study is that quality in pancreatic surgery extends beyond technical excellence in the operating room. It also depends on the systems, teams, and organizational structures that support patients in the postoperative period.

3.3 Understanding Complexity and Adverse Events

Beyond quality indicators, SPANDISPAN also examined specific complications and complex clinical scenarios linked to increased perioperative risk. These studies addressed some of the most challenging aspects of contemporary LP, including severe postoperative hemorrhage[20], conversion during minimally invasive surgery[21], and extended resections for advanced disease[22].

- Postpancreatectomy Hemorrhage: Understanding a Rare but Potentially Devastating Complication

Although postoperative pancreatic fistula remains the most common complication after LP, post-pancreatectomy hemorrhage (PPH) is often considered the most feared. Its incidence is relatively low compared with other postoperative adverse events, yet its consequences are substantial, including reintervention, prolonged hospitalization, increased resource utilization, and significant mortality. Consequently, understanding the mechanisms and risk factors associated with PPH remains an important objective in pancreatic surgery research.

The SPANDISPAN registry provided a unique opportunity to prospectively evaluate this complication in a contemporary national cohort. The analysis confirmed that PPH remains an uncommon event after LP, affecting only a small proportion of patients. Nevertheless, when hemorrhage occurred, it was frequently associated with a more complex postoperative course, marked by higher rates of clinically relevant pancreatic fistula, reinterventions, and prolonged hospital stay.

Several clinical and technical factors were associated with an increased risk of hemorrhage. However, perhaps the most clinically relevant observation was the strong association between PPH and postoperative pancreatic fistula. This finding supports the widely accepted concept that hemorrhage often results from local inflammatory processes and vascular erosion in the setting of pancreatic leakage rather than from an isolated postoperative event.

Importantly, despite the severity traditionally associated with PPH, mortality in the SPANDISPAN cohort remained exceptionally low. This finding likely reflects advances in postoperative surveillance, interventional radiology, endoscopic therapies, and multidisciplinary management.

The principal contribution of this study was twofold. First, it identified factors associated with an increased risk of hemorrhage after LP. Second, and perhaps more importantly, it reinforced the concept that PPH should be understood within the broader context of postoperative pancreatic fistula and overall complication management.

- Conversion During Minimally Invasive Left Pancreatectomy: Failure or Safety Strategy?

The progressive adoption of minimally invasive LP is one of the most important developments in contemporary pancreatic surgery. However, despite increasing experience and technological advances, conversion to open surgery remains necessary in some cases. Historically, conversion has often been viewed as a technical failure or as an indicator of inadequate preoperative planning. More recently, an alternative perspective has emerged, viewing conversion as a safety strategy to prevent more serious intraoperative complications.

Using data from the SPANDISPAN registry, a dedicated analysis evaluated the incidence, causes, and consequences of conversion during minimally invasive LP[21]. The study, currently submitted for publication, is one of the first prospective national assessments of this issue.

The analysis demonstrated that conversion was associated with increased operative complexity, including longer operative times, greater blood loss, and a more demanding postoperative course. Patients requiring conversion experienced higher rates of complications and longer hospital stays than those undergoing completed minimally invasive procedures. However, these findings should not be interpreted as evidence that conversion itself causes adverse outcomes. Rather, conversion frequently reflected the presence of difficult anatomy, unexpected intraoperative findings, vascular involvement, or technical challenges that increased procedural complexity from the outset.

Perhaps the most important contribution of this study was reinforcing a concept increasingly accepted in pancreatic surgery: conversion should not be viewed as a failure. On the contrary, timely conversion may reflect sound surgical judgment and a commitment to patient safety. The willingness to abandon a minimally invasive approach when necessary is often a sign of experience rather than inadequacy.

The findings, therefore, support a more nuanced interpretation of minimally invasive LP. Success should be defined not by completing the operation laparoscopically or robotically, but by achieving the safest possible outcome for the patient.

- Extended Left Pancreatectomy: When Technical Complexity Meets Tumor Biology

Extended LP is among the most demanding procedures in pancreatic surgery. These operations frequently require multivisceral or vascular resection to achieve complete oncological clearance and are typically performed in patients with locally advanced disease. Although increasingly accepted in specialized centers, questions remain about their true impact on perioperative outcomes and oncological benefit.

A recent SPANDISPAN analysis, currently under review for publication, evaluated postoperative and short-term oncological outcomes after extended LP in a prospective national cohort[22]. Among patients undergoing LP, a substantial minority required extended resections according to International Study Group of Pancreatic Surgery criteria, reflecting the growing complexity of contemporary pancreatic surgical practice.

As expected, extended procedures were associated with longer operative times, greater blood loss, reduced use of minimally invasive approaches, and prolonged hospitalization. Nevertheless, rates of major complications and clinically relevant postoperative pancreatic fistula remained comparable to those observed after standard LP, suggesting that extended resections can be performed safely in experienced hepatopancreatobiliary units.

Table 1. Principal Scientific Contributions of ERPANDIS and SPANDISPAN

Registry	Study	Main Topic	Principal Message
ERPANDIS	Multivisceral resection	Extended surgery	Increased complexity does not preclude acceptable outcomes
ERPANDIS	Mucinous cystic neoplasms	Histology	LP is performed for biologically distinct diseases
ERPANDIS	Delayed gastric emptying	Morbidity	DGE remains relevant after LP and is linked to POPF
ERPANDIS	Textbook outcome	Quality assessment	Composite metrics better reflect surgical quality
ERPANDIS	Splenic vessel involvement	Oncology	Radiologic findings may predict tumour aggressiveness
SPANDISPAN	Benchmarking	Surgical excellence	Defines the best achievable outcomes after LP
SPANDISPAN	Contemporary outcomes	National practice	LP is safer but not simpler
SPANDISPAN	Histology	Disease heterogeneity	One operation for many diseases remains valid
SPANDISPAN	Volume	Centralization	Institutional expertise influences outcomes
SPANDISPAN	FTR	Quality systems	Rescue capacity is as important as complication prevention
SPANDISPAN	Postpancreatectomy hemorrhage	Severe complications	PPH is strongly associated with POPF
SPANDISPAN	Conversion	Minimally invasive surgery	Conversion is often a safety strategy rather than a failure
SPANDISPAN	Extended LP	Advanced disease	Tumour biology outweighs technical complexity

The most important observations emerged from the oncological analysis. Patients undergoing extended resections presented more advanced disease, higher rates of lymph node involvement, and a significantly greater risk of early recurrence. These findings indicate that outcomes following extended LP are determined not only by technical complexity but also, and perhaps more importantly, by the biological aggressiveness of the underlying tumor.

The principal message of this study extends beyond the technical aspects of surgery. Extended LP should not be viewed simply as a larger operation, but rather as part of a multidisciplinary strategy for the treatment of biologically advanced disease. Ultimately, surgical expertise remains essential, but tumor biology continues to be the dominant determinant of long-term oncological outcomes.

4. What Have We Learned from Twenty Years of Research in Left Pancreatectomy?

The combined experience of ERPANDIS and SPANDISPAN extends beyond the individual findings of their respective studies. Together, the registries provide a unique perspective on the evolution of LP over the past two decades and offer important lessons on surgical quality, patient selection, institutional performance, and oncologic outcomes[23,24].

Left Pancreatectomy Is Not a Minor Pancreatic Operation

Historically, LP has often been viewed as technically less demanding than pancreatoduodenectomy. While this may be true from a reconstructive standpoint, evidence from ERPANDIS and SPANDISPAN shows that LP remains a major pancreatic resection associated with substantial morbidity. Across multiple studies, postoperative complications remained common despite advances in surgical technique, perioperative care, and minimally invasive technology. Benchmark analyses further confirmed that even under optimal circumstances, clinically relevant morbidity cannot be eliminated.

This observation reinforces the need for the same level of expertise, multidisciplinary support, and quality assessment routinely expected for other complex pancreatic procedures.

One Operation for Many Diseases

Perhaps the most enduring concept emerging from this research is that LP is not performed for a single disease but for a remarkably heterogeneous group of pathological conditions. The histology analysis from SPANDISPAN confirmed that outcomes differ significantly according to underlying pathology. Consequently, comparisons between studies, institutions, and surgical techniques must always consider disease-specific factors. Failure to account for pathological heterogeneity risks oversimplifying a procedure that is fundamentally diverse in its indications and objectives.

Postoperative Pancreatic Fistula Remains the Central Challenge

A recurring lesson concerns the dominant role of postoperative pancreatic fistula. Regardless of study design, patient population, or outcome measure, pancreatic fistula repeatedly emerged as the complication most strongly associated with adverse postoperative events.

The influence of pancreatic fistula extended beyond its direct clinical consequences. It contributed to delayed gastric emptying, PPH, prolonged hospitalization, reinterventions, and FTR. In many respects, the history of LP research can be viewed as a continuing effort to better understand, prevent, and manage the consequences of pancreatic leakage.

Despite substantial advances in surgical techniques and perioperative management, postoperative pancreatic fistula remains the principal unresolved challenge following LP.

Quality Depends on More Than Technical Skill

The volume and FTR analyses highlighted another important principle. Surgical quality is not determined solely by operative performance. Institutional experience, multidisciplinary collaboration, postoperative surveillance, interventional radiology, intensive care support, and the ability to recognize and treat complications all contribute to patient outcomes.

This broader understanding of quality explains why concepts such as benchmarking, textbook outcomes, and FTR have become increasingly important in contemporary pancreatic surgery[12,18,19,23,24]. Excellent results require not only skilled surgeons but also effective systems of care that support patients throughout the perioperative journey.

Tumor Biology Ultimately Determines Oncological Outcomes

Although technical complexity remains an important determinant of perioperative risk, several studies have

shown that long-term outcomes are more strongly influenced by biological factors than by surgical difficulty alone. Analyses of splenic vessel involvement, pathological subtype, and extended LP consistently show that tumor aggressiveness frequently outweighs technical considerations when recurrence and survival are evaluated.

This observation serves as a reminder that surgery is only one component of modern pancreatic cancer care. Accurate staging, multidisciplinary decision-making, systemic therapies, and patient selection remain fundamental determinants of oncological success.

Collaboration Generates Better Evidence

The final lesson may be the most important. Neither ERPANDIS nor SPANDISPAN would have been possible through the efforts of a single institution alone. The ability to answer increasingly sophisticated clinical questions depended entirely on collaboration among surgeons willing to share data, standardize definitions, and learn from collective experience.

The transition from a retrospective multicenter registry of eight institutions to a prospective nationwide cohort of 41 centers illustrates the remarkable potential of collaborative research networks. More importantly, it shows that meaningful scientific contributions can arise from cooperation rather than competition.

Ultimately, the greatest achievement of ERPANDIS and SPANDISPAN may not be the publications they produced, but the collaborative culture they fostered. By transforming individual institutional experiences into shared knowledge, both registries contributed not only to a better understanding of LP but also to the development of a national community committed to continuous quality improvement and scientific progress.

5. Future Perspectives: Building Collaborative Registries Beyond Spain

The experience gained through ERPANDIS and SPANDISPAN shows that clinical registries can deliver benefits that extend far beyond scientific publications. Although the academic output of both projects has been substantial, their true value lies in their ability to improve quality assessment, facilitate benchmarking, monitor outcomes, and promote collaboration among pancreatic surgeons.

Perhaps the most important lesson from these initiatives is that successful collaborative research does not necessarily require large financial investments or sophisticated infrastructure. Instead, it depends on motivated clinicians, standardized definitions, reliable data collection, and a shared commitment to improving patient care through collective learning. The Dutch Pancreatic Cancer Group's experience demonstrated that nationwide registries could transform a specialty by generating high-quality scientific evidence while improving clinical practice[3]. Similar experiences have since emerged throughout Europe, creating networks that integrate research, quality improvement, and professional development.

The Spanish experience, represented by ERPANDIS and SPANDISPAN, shows that these principles can be successfully adapted to diverse healthcare systems and organizational settings. What began as a retrospective collaboration among a small number of institutions evolved into a prospective nationwide registry capable of addressing increasingly complex clinical questions. Equally important, it created a community of surgeons committed to transparency, benchmarking, and continuous quality improvement.

The potential relevance of this model extends across Southeastern Europe. Several centers throughout the region have increasingly contributed to the international pancreatic surgery literature and participate actively in European hepatopancreatobiliary surgical societies. Developing prospective collaborative registries in Kosovo, Albania, North Macedonia, and neighboring countries could offer valuable opportunities to monitor outcomes, benchmark performance, strengthen national surgical networks, and generate evidence that reflects local clinical. Beyond their scientific value, such initiatives may facilitate regional cooperation, promote standardization, and support the development of future collaborative research projects.

Importantly, registries should not be viewed solely as research tools. They also serve as mechanisms for professional development and capacity building. By encouraging participation in multicenter projects, registries create opportunities for younger surgeons to engage in clinical research, develop academic skills, and contribute to generating evidence that directly influences patient care.

Importantly, the story of collaborative LP research in Spain does not end with SPANDISPAN. Building on the experience gained through ERPANDIS and SPANDISPAN, a new nationwide prospective registry, the Spanish Left Pancreatectomy Project (SPANLEPAN), is scheduled to begin on January 1, 2027. The project will

involve 55 hospitals across Spain and is planned for a four-year period. Beyond continuing previous collaborative efforts, this initiative reflects the consolidation of a national research network capable of addressing increasingly complex clinical questions while promoting quality assessment, benchmarking, and continuous improvement in pancreatic surgery.

The launch of SPANLEPAN demonstrates that collaborative research has evolved from an isolated project into a sustainable model for scientific advancement in pancreatic surgery. In this sense, the most important legacy of ERPANDIS and SPANDISPAN may not be the studies they produced, but the collaborative infrastructure they helped build.

The future of pancreatic surgery research will increasingly depend on cooperation among centers, countries, and professional societies. Registries provide one of the most effective mechanisms for achieving this cooperation, enabling collaborative networks that can transform data into knowledge and knowledge into better patient care.

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