The adequacy of hepatopancreatobiliary training: How does operative exposure and perceived readiness in fellowship translate into subsequent practice?

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SUMMARY

Over the last 3 decades, expansion in the scope and complexity of hepatopancreatobiliary (HPB) surgery has resulted in significant improvements in postoperative outcomes. As a result, the importance of dedicated fellowship training for HPB surgery is now well established, and the definition of formal program requirements has been actively pursued by a collaboration of the 3 distinct accrediting bodies within North America. Although major advances have been made in defining minimum case volume requirements, qualitative assessment of the operative experience remains challenging. Our research collaborative (HPB Manpower and Education Study Group) has previously explored the perceived case volume adequacy of core HPB procedures within fellowship programs. We conducted a 1-year follow-up survey targeting the same cohort to investigate the association between operative case volumes and comfort performing HPB procedures within initial independent practice.

The knowledge currently required for surgical subspecialty practice has clearly exceeded the training capacity of most general surgery residencies. Concomitant expansion of nonsurgical treatments and the increasing complexity of operations have further limited the operative experience of residents and subsequently their confidence to operate independently. The educational impact of resident work hours and autonomy restrictions also remains uncertain.¹ Most concerning is the lack of confidence to operate independently that has been reaffirmed as a common trait among general surgery graduates seeking postresidency subspecialty training.² In this setting, fellowship programs offer an additional opportunity to improve operative skills, encourage autonomy and build confidence at the subspecialty level before starting independent practice. Improved clinical outcomes for complex operations performed at high-volume centres and growing public demands for safety have further propelled the phenomenon of surgical subspecialization. Currently, more than 80% of general surgery residents pursue postresidency subspecialty training.³

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cohort of fellows from our index study (Fellowship Council-accredited HPB programs in the 2013/2014 academic year), with the objective of understanding the association between operative case volumes and comfort performing HPB procedures within initial independent practice. Survey methodology interrogated 4 domains (demographics, education, practice profile, surgical experience) within 13 core HPB procedures. Our follow-up survey yielded a 91% (19/21) response rate. The mean age of respondents was 36 (range 33–43) years. Respondents had either just completed their first year of practice (11/19), or their second year of fellowship (8/19).

FIRST YEAR OF INDEPENDENT PRACTICE

All 11 former HPB fellows reported affiliation with an academic institution. Eight are employed in university teaching hospitals (7 with full-time and 1 with part-time academic appointments), and 3 work in community hospitals with a general surgery residency. The average workload exceeds 60 hours per week for most (8/11) and comprises clinical care and surgery (68% [55%–90%]), research (12% [10%–25%]), teaching (9% [5%–20%]), and administrative activities (7% [5%–20%]). All former fellows had a practice mixture beyond isolated HPB surgery: combined with elective general surgery (4/11), acute care surgery (4/11) and liver transplantation (2/11). Reported specialty-specific practice encompassed 39% liver (10%–50%), 39% pancreas (20%–80%) and 18% biliary (10%–30%) pathologies. Most respondents (7/11) were not part of an HPB-specific call schedule, though only 4 participants did not work as part of an HPB group. Dedicated research time involved clinical research (6/11), basic science research (1/11), or both (4/11).

CASE VOLUMES

With the exception of open distal pancreatectomies and radical cholecystectomies, average case volumes were lower as an attending surgeon than as a fellow (Table 1). Case volumes for chronic pancreatitis were low during both training and the first year of practice. Hilar cholangiocarcinoma resections, pancreatic necrosectomy, drainage procedures, and celiac plexus blockade also remained infrequent.

COMFORT LEVEL PERFORMING HPB PROCEDURES

Comfort in independently performing core HPB procedures was most often reported for intraoperative ultrasonography (IOUS; 100%), hepaticojejunostomy (100%), open (100%) and laparoscopic (94%) distal pancreatectomy, minor hepatectomy (94%), pancreaticoduodenectomy (94%), radical cholecystectomy (87%), drainage procedures for pancreatic pseudocysts (87%) and major hepatectomy (67%). Presence of a senior HPB surgeon, either as the primary surgeon or assistant, was considered necessary for hilar resection (73% of respondents), celiac plexus blockade (67%), and surgery for chronic pancreatitis (47%; Fig. 1). These comments are very interesting given the first survey observation that fellows often under-rate their adequacy of case volumes (major hepatectomies, pancreaticoduodenectomies and laparoscopic distal pancreatectomies) as well as their ability to operate independently (minor hepatectomies, hilar cholangiocarcinomas, celiac plexus blockade) when compared with program directors.⁵ Procedures for chronic pancreatitis deserve special mention. Previously reported low case volumes⁴ remained in this updated survey, and opinions about the comfort–volume association were mixed. This topic

Table 1: The mean number of core HPB procedures performed during fellowship training compared with the first year of independent practice

Procedure	Fellow	Staff
Major hepatectomy	46	8
Minor hepatectomy	31	15
Pancreaticoduodenectomy	42	12
Open distal pancreatectomy	5	8
Laparoscopic distal pancreatectomy	15	4
Drainage procedure for pancreatic necrosis	8	1
Surgery for chronic pancreatitis	2	2
Pancreatic necrosectomy	8	1
Radical cholecystectomy	5	6
Hepaticojejunostomy	21	3
Resection of hilar cholangiocarcinoma	11	1
Celiac plexus block	< 1	< 1
IOUS	144	27
Complex biliary reconstruction	6	4

HPB = hepatopancreatobiliary; IOUS = intraoperative ultrasonography.

Fig. 1. Comfort level performing critical steps of core hepatopancreatobiliary (HPB) procedures during the first year of independent practice. DP = distal pancreatectomy; H-J = hepatico-jejunostomy; IOUS = intraoperative ultrasonography.

Fig. 2. Perceived impact of case volumes during fellowship training on comfort performing core hepatopancreatobiliary (HPB) procedures during the first year of independent practice. DP = distal pancreatectomy; H-J = hepatico-jejunostomy; IOUS = intraoperative ultrasonography.

remains a challenge for HPB educators, given that sound surgical judgment for pancreatitis can be extremely complex, more challenging than pancreatic oncology, and often reliant on high-volume exposure as well as a profound understanding of the disease. Laparoscopic distal pancreatectomies displayed a low (< 50%) reported rate of “good or excellent” case volume, but a high degree of preparedness during fellowship training. This updated survey confirms a high degree of comfort performing laparoscopic distal pancreatectomies, with 80% of respondents performing them independently and an additional 13% feeling comfortable enough to teach it to junior residents. These findings do not follow the trends identified for all other procedures and therefore reflect a relative degree of perceived technical simplicity. This is likely a direct result of mastery of the open procedure with a subsequent extrapolation to the laparoscopic methodology. It is also interesting to note that the structured exposure to IOUS in recent years within the FC/AHPBA-accredited fellowship programs (including curricular requirements via an IOUS course) has improved both case volumes and the experience of graduating fellows (high use and comfort by junior staff).

VOLUME-COMFORT ASSOCIATION

Most respondents (83%) believed case volume during training significantly affected their operative comfort level during initial independent practice. This volume-comfort association was most often reported for major hepatectomy (92%), hilar resection (77%), pancreaticoduodenectomy (69%) and minor hepatectomy (69%; Fig. 2). For less frequently performed procedures (celiac plexus blockade and pancreatitis interventions), operative volume during training was not perceived to significantly impact comfort. Hilar lesions deserve additional comment given that less than 40% of fellows reported “good or excellent” exposure in our previous study. Because resectable hilar lesions are relatively rare malignancies, gaining high-volume exposure is unlikely to occur across all training programs. Despite the reality that much can be learned and transposed from other operations, such as major hepatectomies, hilar dissections and complex biliary reconstructions, surgical educators must continue to develop alternative approaches to teaching these complex procedures.

OTHER CONSIDERATIONS

The number of HPB fellowship programs in North America was perceived to be excessive by 57% of respondents. All respondents believed they were adequately prepared during fellowship training, and half felt their goals were “completely” achieved: clinical expertise (100%), technical

expertise (93%), development of a professional network (64%) and improved employability (43%). After the first year of practice, 42% were “very satisfied,” and 50% were “somewhat satisfied” in their jobs. While joining a group, half reported no issues with the transition, but adjustment to group practice was described as an obstacle not anticipated during training. Other hurdles encountered when entering practice included the logistics of billing and of setting up a practice. Suggested improvements in HPB fellowship training included greater autonomy while operating (suggested by 86%), discrete rotations at high-volume centres for specific diseases (64%) and a formal examination at the end of the fellowship (64%). In contrast to general surgery residency training, respondents reported a low interest (14%) in operative simulation to address areas of low preparedness and comfort.

CONCLUSION

Our updated survey reaffirms the importance of case volumes in developing fellows’ confidence across a wide range of operative procedures encompassed by HPB surgery. Appropriate confidence to operate independently, successful placement of former fellows in academic HPB positions and overall perception of accomplishment of training goals are reassuring findings that support ongoing efforts to elevate the quality of HPB fellowship programs within North America.

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