

# Training in hepato-pancreato-biliary surgery during residency: past, present and future perspectives

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**Abstract** The paradigm introduced by William Halsted for surgical residency training has been considered the most appropriate educational system to acquire the knowledge and surgical skills required to become a competent general surgeon. Hepato-pancreato-biliary (HPB) surgery is considered an important part of general surgery training because of its high prevalence and complexity. Nowadays, we are faced with a worldwide shortage of general surgeons candidates, restrictive working hours and less surgical exposure, situations that can undermine the objectives of training in HPB surgery during residency. Moreover, new generations of resident graduates are concerned about their lack of preparedness for independence. We cannot escape from this reality and therefore it justifies a reflection in our HPB surgical world community.

**Keywords** Autonomy · Residency · Subspecialty surgery training · Surgical education · Training

## Introduction

The paradigm introduced by William Halsted for surgical residency training has been considered the most appropriate educational system to acquire the knowledge and surgical skills required to become a competent general surgeon [1]. To obtain these competences demands a physical, emotional and intellectual effort. The length of training varies from a minimum of 4 years in countries such as West Africa and Brazil, where rural basic surgery is in much demand, to at least 8 years in the UK and Hong Kong [2]. Hepato-pancreato-biliary

(HPB) surgery is considered an important part of general surgery training because of its high prevalence and complexity. The aim of the present manuscript is to review the past, present and future perspectives of training in HPB surgery during residency.

Nowadays, we are faced with a worldwide shortage of general surgeon candidates, restrictive working hours and less surgical exposure, situations that can challenge the objectives of training in HPB surgery during residency. Moreover, new generations of resident graduates, many of whom will either have to go on their own or work in other new systems, are concerned about their lack of preparedness for independence [3]. We cannot escape from this reality and therefore it justifies a reflection in our HPB surgical world community.

## Current HPB surgical training model

Modern HPB surgery has become technically complex, technology dependent and has an increased number of mini-invasive procedures. This fact forced us to take cases out of resident hands and place them in the domain of specialist fellows or staff surgeons. Furthermore, surgical residents' exposure with frequent HPB procedures such as open cholecystectomy, common bile duct exploration, T-tube placement, transduodenal papilotomy, pancreatic necrosectomy, and choledochoenteric anastomosis has dramatically decreased or is inexistent (as these procedures are practically not performed anymore); reducing the experience of autonomous residents in the HPB exercise. These may be among the causes of why up to 80% of general surgeon graduates continue with fellowship training in the USA [4]. This is also the reality in our surgical department, where more than 90% of residents seek further training. To avoid a decrease in resident exposure to HPB procedures, it is essential to build a resident curricula with clear objectives, contents and

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strategies to achieve the skills, knowledge and attitudes for each training program. In Japan, most of the surgical training has been conducted as “on the job training” without structured curriculum for a long while, and more priority has been given to clinical work and research compared with resident education in teaching hospitals. While recently, there is a tendency for the university-based teaching hospitals to have more resources and teaching staff available for resident education, most community hospitals cannot afford to employ dedicated teaching staff for resident education [5]. This situation can also be seen in other countries. The SCORE consortium established a list of operations and procedures for a general surgery residency graduate, defined in three categories: essential-common, essential-uncommon, complex [6]. This kind of standardized evaluating tool also exists in Argentina, but categories are scored from 1 to 7 according to the complexity levels of the surgical procedure [7]. It is clear that surgical training among the different countries and models presented shares similarities and faces similar challenges; all of them are currently curriculum-based, with a move toward competence-based [2]. In the Netherlands, all programs and program directors are obliged by law to undergo regular peer-organized and peer-conducted quality control checks at least once every 5 years, in which a delegation performs a site visit, interviewing the surgical team and the residents and the hospital board on a variety of topics concerning the program [8]. In Japan, the board certification system for expert surgeons qualified by the Japanese Society of HPB Surgery consists of board certified training institutions, board-certified instructors, and board-certified expert surgeons. Board-certified A training institutions and board-certified B training institutions are required to perform at least 50 and 30 high-level HBP procedures per year, respectively. Experience performing 100 or more high-level HBP surgeries as an operator or an assistant is mandatory for a board-certified instructor applicant. Experience performing 50 or more high-level HBP surgeries as an operator during 3–7 years’ training at board-certified training institutions is mandatory for a board-certified expert surgeon applicant [9].

On the other hand, it is important to determine which training programs have the capacity to sustain a fellowship in HPB surgery that does not impair resident education. This should probably be reserved for high-complexity HPB centers with the corresponding regional and international accreditation, as residents at high-volume centers are more likely to exceed the curricula requirements for HPB surgeries [10, 11]. Therefore we must recognize that the percentage of high-complex HPB procedures performed at community centers is low and in this scenario it might be difficult to achieve the corresponding surgical curricula. Furthermore, less than one-third of fellowship programs registered on the IHPBA website were offered a program that was compatible with IHPBA standards

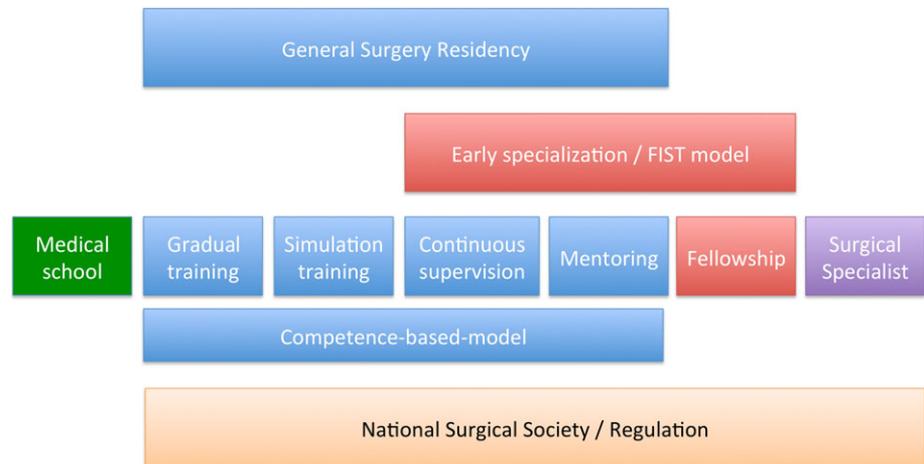
and only 54% of fellows completed the program’s objectives during the course of their training [12]. This is accompanied by another conflict in current times, where many hyper-specialist surgeons finish their training and afterwards finally find a position either going back to general surgery or other areas of specialization. Recently, the American Board of Surgery began allowing programs to have flexibility in surgical training (FIST), with as many as 12 of the 36 months of senior residency spent in training in a single content area [13]. The implementation of the FIST has been a positive experience, with increased clinical experiences, mentorship, and autonomy [14]. However, these combined training programs have some drawbacks; if a trainee changes her or his mind, it is much more difficult to switch into a different track without the loss of years of training [3], and according to each country’s legislation it would be difficult to obtain a certification in general surgery.

### **Postgraduate HPB training**

Postgraduate training in HPB surgery can be accomplished in several ways. In North America, advanced training paradigms that include HPB surgery are available through the American Society of Transplant Surgeons (ASTS), the Society of Surgical Oncology (SSO), and the Americas Hepato-pancreato-biliary Association (AHPBA) fellowships. The AHPBA, in conjunction with the Fellowship Council, currently offers 26 fellowship positions across the USA and Canada. Twenty-one programs offer HPB only training (11 one-year programs and 10 two-year programs), three offer HPB training embedded within the SSO training model, and two offer HPB training that is embedded [15]. In the South American region (Argentina and Brazil) can be found 14 HPB fellowship programs registered in IHPBA. Since 1992, over 44 fellows have graduated and more than 68 general surgery residents have been trained at the Division of HPB Surgery and Liver Transplant from the Hospital Italiano de Buenos Aires. Recently, Baker et al. define the qualities and characteristics of successfully matched HPB surgical fellows. They concluded that the most important qualities in an HPB fellow, as ranked by both program directors and fellows, are interpersonal and perceived operative skills, closely followed by perceived fund of knowledge and communication skills [15].

### **Surgical skills learning curve**

General surgery residents take the responsibility to learn complex skills in a society that is progressively interested in the efficiency and quality of the health care system [16]. This opens a debate about their influence on patient outcomes. In this regard, recent evidence has shown that resident participation as operating surgeons in surgical procedures of varying

**Fig. 1** Proposal for the current surgical training

complexity, may be considered ethical, safe, and responsible whenever implemented in the framework of a residency-training program with continuous supervision and national accreditation [7]. Moreover, recent results from the ACS NSQIP database found that although both liver and pancreas resections with resident participants resulted in a longer operative time, other parameters such as duration of stay and perioperative major morbidity were unaffected [17]. Sachs et al. [18] characterized and quantified the procedural volumes of complex HPB procedures among graduating chief residents, concluding that half performed fewer than 10 cases in each of the liver, pancreas, or biliary categories. Undoubtedly, this represents a low number of cases taking into account that the learning curve and patient outcomes continues with extensive experience [19] and probably postgraduate surgeons have not enough case numbers to handle complex HPB cases without additional training [18]. Nevertheless, postoperative short- and long-term outcomes could be acceptable for pancreaticoduodenectomy performed by young surgeons, when they received high-level education under the guidance of a supervisory doctor [20].

### Future perspective of surgical training

The current scenario in HPB surgical training during residency, as abovementioned, is complex and multiple conflicting factors are involved. From the current circumstances, those who are in leading or teaching positions have the obligation of asking ourselves: should we change the paradigm in general surgical training? Should we focus resident surgical training for prevalent HPB pathology? Or, should we put more effort in high complex procedures?

In general, a potential but more radical solution could be, as already implemented in some programs, an earlier subspecialty where the candidate has some years of training in general surgery and then focuses on the chosen specialization

among those available. However, in our opinion there are some specific measures that should be implemented independently of any paradigm change in current surgical training as already established. First, training should be gradual and based on a tutorial system with progressive delegation of responsibilities: from high prevalent HPB surgeries, as a priority, and – as experience is gained – to more complex cases. Second, as there is increasing evidence to support the use of simulation during surgical training, we should implement these models that encourage deliberate practice, evaluation, and resident feedback, to acquire the initial learning curve under simulation and afterwards take the most advantage of case volume in human practice. Third, all surgical residency programs should be implemented with continuous supervision and the corresponding national accreditation. Fourth, the role of mentoring should be crucial during the process; the pupil-teacher phenomenon must be active and based on that wonderful feeling of empathy, admiration and mutual respect. Finally, each national Surgical Society in collaboration with each respective subspecialist Society should somehow propose or regulate the quantity of new specialists trained based on a conscious evaluation of regional requirements in order to avoid both professional frustration and a mispend of valuable human resources of the surgical community (Fig. 1). Even though the present manuscript was born from an HPB surgical community, the reality mentioned could be most likely extrapolated to any other surgical specialty as well.

**Conflict of interest** None declared.

### References

1. Pellegrini C. Surgical education in the United States. Navigating the white waters. *Ann Surg.* 2006;244:335–42.

2. Itani KM, Morris PJ, Macias FC, Bevilacqua RG, Cheng SW, Ladipo JK, et al. Training of a surgeon: an international perspective. *J Am Coll Surg.* 2007;204:478–85.
3. Eberlein TJ. A new paradigm in surgical training. *J Am Coll Surg.* 2014;218:511–8.
4. Borman KR, Vick LR, Biester TW, Mitchell ME. Changing demographics of residents choosing fellowships: longterm data from the American Board of Surgery. *J Am Coll Surg.* 2008;206:782–8.
5. Kurashima Y, Watanabe Y, Ebihara Y, Murakami S, Shichinohe T, Hirano S. Where do we start? The first survey of surgical residency education in Japan. *Am J Surg.* 2016;211:405–10.
6. American Board of Surgery. The Booklet of Information – Surgery. 2015-2016. [Cited 13 Oct 2016.] Available from URL: <http://www.absurgery.org/xfer/BookletofInfo-Surgery.pdf>
7. de Santibañes M, Alvarez FA, Sieling E, Vaccarezza H, de Santibañes E, Vaccaro CA. Postoperative complications at a university hospital: is there a difference between patients operated by supervised residents vs. trained surgeons? *Langenbecks Arch Surg.* 2015;400:77–82.
8. Borel-Rinkes IH, Gouma DJ, Hamming JF. Surgical training in the Netherlands. *World J Surg.* 2008;32:2172–7.
9. Miura F, Yamamoto M, Gotoh M, Konno H, Fujimoto J, Yanaga K, et al. Validation of the board certification system for expert surgeons (hepato-biliary-pancreatic field) using the data of the National Clinical Database of Japan: part 1 - Hepatectomy of more than one segment. *J Hepatobiliary Pancreat Sci.* 2016; 23:313–23.
10. Zyromski NJ, Torbeck L, Canal DF, Lillemoe KD, Pitt HA. Incorporating an HPB fellowship does not diminish surgical residents' HPB experience in a high-volume training centre. *HPB (Oxford).* 2010;12:123–8.
11. Dae SS, Flynn JC, Jacobs MJ, Mittal VK. Analysis and implications of changing hepatopancreatobiliary (HPB) case loads in general surgery residency training for HPB surgery accreditation. *HPB (Oxford).* 2013;15:1010–5.
12. Raptis DA, Clavien P-A. Evaluation of Hepato-Pancreato-Biliary (HPB) fellowships: an international survey of programme directors. *HPB (Oxford).* 2011;13:279–85.
13. American Board of Surgery. Flexible rotations. 2014. [Cited 4 Apr 2015.] Available from URL: <http://www.absurgery.org/default.jsp?policyflexrotations>
14. Klingensmith ME, Awad M, Delman KA, Deveney K, Fahey TJ 3rd, Lees JS, et al. Early Results from the Flexibility in Surgical Training Research Consortium: Resident and Program Director Attitudes Toward Flexible Rotations in Senior Residency. *J Surg Educ.* 2015;72:e151–7.
15. Baker EH, Dowden JE, Cochran AR, Iannitti DA, Kimchi ET, Staveley-O'Carroll KF, et al. Qualities and characteristics of successfully matched North American HPB surgery fellowship candidates. *HPB (Oxford).* 2016;18:479–84.
16. Davis SS Jr., Husain FA, Lin E, Nandipati KC, Perez S, Sweeney JF. Resident participation in index laparoscopic general surgical cases: impact of the learning environment on surgical outcomes. *J Am Coll Surg.* 2013;216:96–104.
17. Ejaz A, Spolverato G, Kim Y, Wolfgang CL, Hirose K, Weiss M, et al. The impact of resident involvement on surgical outcomes among patients undergoing hepatic and pancreatic resections. *Surgery.* 2015;158:323–30.
18. Sachs TE, Ejaz A, Weiss M, Spolverato G, Ahuja N, Makary MA, et al. Assessing the experience in complex hepatopancreatobiliary surgery among graduating chief residents: is the operative experience enough? *Surgery.* 2014;156:385–93.
19. Fisher WE, Hodges SE, Wu MF, Hilsenbeck SG, Brunicaudi FC. Assessment of the learning curve for pancreaticoduodenectomy. *Am J Surg.* 2012;203:684–90.
20. Kawahara R, Akasu G, Ishikawa H, Yasunaga M, Kinoshita H. A questionnaire on the educational system for pancreatoduodenectomy performed in 1,134 patients in 71 institutions as members of the Japanese Society of Pancreatic Surgery. *J Hepatobiliary Pancreat Sci.* 2013;20:173–85.