Viewpoint

The German Transplant Certification

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Since the inception of solid organ transplantation through the 50s and 60s of the 20th century, transplantation has evolved into a major driver not only in the field of surgery, but immunology, pharmacology, pathology, internal medicine, providing new techniques and concepts to provide services for patients, that had been doomed to succumb to their acute or chronic disease. Pioneering surgeons not only developed surgical techniques but were drivers in the development of immunosuppression as well as the inclusion of other specialties into multidisciplinary teams.

The rapid evolution of the transplantation field from pioneering work to standard service, particularly evolved in the United States (US) with a standardized educational fellowship for transplant surgeons under the governance of the American Society of Transplant Surgeons (ASTS) with a formalized abdominal transplant surgery fellowship training in 1980, the shaping of an educational training, based on guidelines and a certification process for transplant surgery training programs (1,2). The fellowship for abdominal transplant surgeons is organized as an annual abdominal transplant surgery fellowship match. The impressive possibility to attract national and international fellows into the programs further helped not only to disseminate scientific, technical and clinical knowledge, but ethical and moral standards on a global level as well. Likewise did the European Board of Surgery (EBS), Division of Transplant Surgery, in collaboration with the European Society for Organ Transplantation (ESOT) develop a comparable extensive and dedicated system based on voluntary participation from participating countries in order to provide a certification for transplant surgery (3).

In contrast to this development the training in transplantation in Germany occurred as an unstructured process during the residency in major transplant centers, i.e., with a volume larger than 50 transplants per year, such as Hannover (Rudolf Pichlmayr, Hans Georg Borst), Berlin (Peter Neuhaus, Roland Hetzer), Essen (Friedrich Wilhelm Eigler), and München Großhadern (Walter Land). After 2000, the system stopped to develop. The question why not to establish a fellowship system comparable to the US was seen as unfit for the structure of surgical clinics, only multiorgan retrieval was included into the curriculum for visceral surgery as a "training ground" (P. Neuhaus, personal communication) for young surgeons. Rather than structuring the education and building a uniform educational system, fellows were either sent for training to the US, or trained in the larger volume centers. In the early 2000 years, three major problems in the structure of the health care system turned out to be major obstacles of a development such as in the US. The first obstacle was the lack of an educational program for transplant surgeons/physicians, neither in surgery (visceral, thoracic or heart surgery, respectively urology) nor in internal medicine, with the exception of nephrology, even basic knowledge in transplantation was required. The second obstacle was the financial revenue in the diagnosis-related groups

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(DRGs) system, that granted the revenue to the discharging department. Since transplantation was well reimbursed, the evolution of interdisciplinary transplant centers was not feasible, since it needed mutual agreements of outsourcing of workforce, meaning loss of control by individual department directors in either Surgery, Nephrology, Gastroenterology, or Cardiology, etc. Particularly the latter was perceived as loss of control and/or power within the Clinic structure. The third obstacle would have been the change from a still very hierarchical system where the director of a department has the last call regarding any decisions, to a system acknowledging specialized and certified individuals making independent decisions based on multidisciplinary conferences, fully independent from the instructions of a department director. Individual centers tried to establish structures for a transplant surgery fellowship based on the US system, but unfortunately were not successful due to lack of support or consensus within the surgical societies (4), or independent Transplant and Hepato-Pancreato-Biliary (HPB) Surgery Departments were cannibalized, i.e., dissolved and integrated back into the structure of general surgery or internal medicine.

The National German Transplant Curriculum provides a unique framework for all major specialties involved in Transplantation thus being the seed to change gears within the German Transplantation system still paralyzed by a serious transplantation scandal (5-7) a decade ago. The process to shape this was started in 2011 taking the ASTS fellowship program as a blueprint and adopting it in communications with the German Medical Association (GMA) into a board-certified fellowship program provided by the GMA (all board certifications are provided by the GMA). The specialization offered the solution to the above-mentioned three obstacles, beginning from the end. A board-certified education including all specialties involved in transplantation offers independence regarding clinical and scientific decisions from a department director, strengthens interdisciplinary work focusing on patient management and quality service and thus creates the need for a financially independent interdisciplinary unit to achieve these goals, fostering a slow change of the current landscape in transplantation in Germany. Moreover, does the integration of internal medicine specialty services (hepatology, nephrology, cardiology, etc.) into the transplant certification offers the opportunity to identify patients with organ failure at an early stage of disease providing the opportunity of individually tailored medical pathways, such as in alcohol use disorder (AUD) (8). Recently, anesthesia was included into the Board-Certified Fellowship Program of GMA and consultations to include mental health professionals as well as clinical immunologists are on the way.

Education is organized as a mandatory 2-year fellowship in a transplant center consisting of a common content and a special content section, meaning the special content refers to the individual specialization in e.g., surgery, nephrology, etc. A prerequisite for participation in the fellowship program is a board certification in a specialized field, such as abdominal surgery, nephrology, etc. The fellowship program is currently available for abdominal surgeons, thoracic surgeons, cardiovascular surgeons, urologists, nephrologists, hepatologists, cardiologists, pulmonologists, pediatricians and recently anesthesia was added. The common content involves legal, ethical and societal aspects of transplantation including the special German situation in organ transplantation explicitly ruling out donation after cardiac death (DCD) or putting a particular emphasis on the protection of living donors (subsidiary donation). Knowledge in infection and immunology, particularly compatibility and the human leukocyte antigen (HLA) system, pharmacology of immunosuppressive drugs as well as selection of patients for the waitlist and its management are as well mandatory basics for all applicants.

Special knowledge focuses on surgical skills and techniques, perioperative management and monitoring including Doppler-ultrasound, endoscopy (gastroenterology/hepatology), preoperative waitlist management and performing graft biopsies. Training for surgeons involves a completed surgical training of one specialty including certification and participation of surgical procedures in transplantation as principal surgeon certified by the department director and validated by the local medical association. The number of procedures is comparable to requirements in the US respectively the voluntary EBS certification. The safety of living donors is of particular importance for surgeons, hence specialized training along with qualifying numbers of procedures for living liver or living renal donation are required. A specialized HPB education does not exist in Germany, or neither is it a part of the transplant fellowship as in Transplant Accreditation & Certification Council (TACC). In addition, surgeons performing renal transplants require additional training in living renal donation as well since it is not part of the general surgery curriculum (*Table 1*).

Certified educational programs are offered by the German Transplantation Society (9,10) such as mentoring

Table 1 Surgical volume requirements

Parameters	ASTS TACC (1)	EBS (3)	German Transplant Certification (7)
Total transplant volume	50	–	–
Multi-organ procurements	25	32 [40]	25
Kidney	40	20 [20]	25
Living donor nephrectomies	12[†]	0 [5]	20
Living donor transplantations	–	0 [5]	–
Pediatric	–	0 [5]	–
Graft nephrectomy	–	0 [5]	–
Surgical or interventional management of complications of kidney transplantation	–	2 [10]	–
Kidney biopsy	–	5 attended	25
Color coded duplex sonography	–	–	25
Liver	45	20 [20]	30
Living donor hepatectomies	–	0 [2]	20
Liver re-transplantation	–	0 [2]	–
Surgical or interventional management of complications of liver transplantation	–	0 [10]	–
Liver biopsy	–	5 attended	25
Color coded duplex sonography	–	–	25
Pancreas	10	5 [5]	15
Back table preparations	10	5 [5]	–
Pancreas procurements	10	2 [10]	–
Intestine	10	–	–
Heart	–	–	15
Heart procurements			25
Lung	–	–	15
Lung procurements			25
HB[†]	Minimum 35 HB cases		
	Minimum of 15 hemi-hepatectomies		
	Minimum of 15 biliary procedures		
HPB[‡]	Minimum 50 HPB cases		
	Minimum of 15 hemi-hepatectomies		
	Minimum of 15 biliary procedures		
	Minimum of 15 non-transplant major pancreatic procedures		

Data are presented as number of patients, number of procedures, or number of procedures [numbers of assisted procedures required]. [†], fellows can perform a minimum of 12 living donor nephrectomies in the principal or participant role (1); [‡], fellows must have successfully completed a fellowship in liver transplantation in order to be eligible for intestinal, HB, or hepatopancreatobiliary certificate of completion (1). ASTS, American Society of Transplant Surgeons; TACC, Transplant Accreditation & Certification Council; EBS, European Board of Surgery; HB, hepatobiliary; HPB, hepato-pancreato-biliary.

programs, individual conferences, and a 5-day course, the "Walter-Brendel Curriculum" (11) in collaboration with the German Transplantation Academy.

The German Transplant Certification will certainly be an important milestone to consolidate the transplant system, but we shall not forget that it took from 2011 until 2018 to get it approved by the GMA and another 5 years until 2023, that every federal country medical association (n=16) had it approved and implemented. The certification became a prerequisite in guidelines regulating the structure of transplant centers as well as the surveillance of the quality of services as supervised by the Institute for Quality Assessment and Transparency in Health Care (IQTIG) (12). The next milestones are an integrated organization structure in form of a guideline by the StäKO according to the German Transplant Law, §16, for transplant centers, which has been rejected (requirements for the quality assurance measures required in connection with organ removal and transfer) to date by the GKV [National Association of Statutory Health Insurance Funds ("GKV-Spitzenverband")] and the DKG [German Hospital Federation (Deutsche Krankenhaus Gesellschaft)].

Assuming that the number of procedures done in 2 years should be at least two times the number of procedures performed by a fellow, out of 37 active renal transplant centers 10, out of 21 liver transplant centers 2, out of 17 pancreas transplant centers none, out of 18 heart transplant centers 7 and out of 10 lung transplant centers 3 would qualify (13) to offer structured education for the German Transplant Certification. Hence a concentration in a few centers comparable to the situation in The Netherlands or the UK is mandatory and exactly here is the proof in the pudding, since it becomes a conflict of interest between the DTG [German Transplantation Society (Deutsche Transplantations Gesellschaft)], GMA, DKG, GKV and particularly the federal countries (n=16), much in favor to have their own transplant center.

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