

# Liver transplantation as a multidisciplinary strategy for undergraduate education

## *Transplante de fígado como estratégia multidisciplinar de ensino de graduação*

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### ABSTRACT

The program of liver transplantation can contribute in an excellent manner to undergraduate education on a daily basis, especially in the form of scientific initiation with studies of experimental investigation in the laboratory or as formal monitoring in experimental or clinical investigation. In the latter modality, the student helps his tutoring professor in activities more related to the ward and to the Surgical Center, with studies on the clinical follow-up of patients, or with case studies in both prospective and retrospective investigations. It is the task of the adviser to attribute balanced activities whose time of execution will not interfere with formal graduation hours. Similarly, it is the responsibility of the student to structure his free time in order to devote part of it to the exercise of scientific activity. On this basis, the medical student will have the opportunity to experience the most varied facets of transplantation, acquiring the necessary systemic view of the procedure as his knowledge expands. The importance of liver transplant is exactly this, i.e., to obtain a complete idea of the whole with daily contact along time starting from the complex parts that constitute the procedure, exposes the student to diverse clinical situations rarely encountered together in other specialties, permitting him to participate in situations and discussions that are not often addressed during the medical course.

**Key words:** Liver Transplantation. Medical Teaching. Undergraduation Medical Education.

In its current situation, liver transplantation represents one of the most spectacular advances in the history of medicine.<sup>1,2,3</sup> Modifying an organism immunologically so that it will be able to accept an organ from another organism was a significant challenge met and overcome in the past century. Over the years, its trajectory has been an example of the ex-

traordinary progress of modern medicine thanks to teamwork, to super-specialization and to its inter- and multidisciplinary nature. The combination of factors such as the development of various branches of the medical and basic sciences and of modern technology has led to liver transplantation as a routine procedure in current medical practice.<sup>1,2,3</sup>

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At first sight, the transplantation of organs in general, and of the liver in particular, seems to be something so highly complex even in today's times that it should be destined to postgraduate courses as a subject of super-specialized study and education, thus being limited to a highly differentiated student body from an academic viewpoint.<sup>2,3,4</sup>

However, we believe that we should look at transplantation in a different manner, even though we continue to perceive it as a highly complex procedure. In this respect, liver transplantation represents an excellent form of undergraduate education in daily practice, especially as a form of scientific initiation involving studies of experimental laboratory investigation or as a form of formal monitoring in experimental or clinical investigation (Table 1). In this second modality, the student assists his tutoring professor in activities more related to the wards and to central surgery, with studies on the clinical follow-up of patients or with case studies in both prospective and retrospective investigations. It is the responsibility of the advising professor to assign balanced activities whose time schedules do not conflict with formal graduation schedules. Similarly, it is the student's responsibility to structure his free time in such a way as to devote part of it to the exercise of scientific activity.<sup>4</sup>

The transplant favors simultaneous contact with different areas of medical education on the part of

**Tabela 1**

Scientific initiation and monitoring activities within the interdisciplinary program of liver transplantation

<i>Activities</i>	<i>Monitoring</i>	<i>Scientific Initiation</i>
Scientific Investigation	Yes	Yes
Ward	Yes	*
Central Surgery	Yes	*
Experimental Laboratory	*	Yes

\*Optional activities according to the discretion of the adviser.

medical students, permitting them to understand the need for these different sectors to act jointly to benefit the patient. In addition, by being a procedure of high complexity, the transplant is an example of the essential relationship of interdependence between the spheres of basic and clinical knowledge.<sup>4-8</sup>

Thus, undergraduate medical students will have the opportunity to experience the most varied facets of transplantation, learning little by little about the "elephant" that arises in front of them as their knowledge expands. The importance of transplantation is exactly this, i.e., to gain an idea of the whole based on the complex parts that constitute it and that represent the concept of multidisciplinary, as shown in Table 2. Whoever experiences only one or two of the items

**Tabela 2**

Specialties directly involved in liver transplantation

<i>Specialties</i>	<i>Departments/Divisions</i>	<i>Aspects</i>
Clinical	Clinical Surgery	Development and improvement of surgical techniques
	Experimental Surgery	Complex surgical procedure
	Anesthesiology	Advanced anesthesia resources
	Hematology	Clotting disorders and hemotherapy
	Infectology	Infections, management with antibiotics, septic signs and symptoms
	Pneumology	Complications and prevention
	Physiotherapy	Prevention and therapy
	Clinical hepatology	Diagnosis and treatment of viral hepatitis and of cirrhosis
	Radiology	Diagnostic and therapeutic
Psychology	Follow-up of patients and relatives	
Basic	Biochemistry	Changes in ischemia/reperfusion
	Anatomy	Constant acquisition and application of skills
	Immunology	Immunosuppression
	Pathology	Diagnosis of liver diseases and similar ailments

shown in this table are destined to have an idea of only the tail, the proboscis or of other limited parts of the elephant. And, with a fragmented vision of transplantation, the understanding of this complex act is very difficult and the teaching-learning process does not consolidate.<sup>4</sup>

The participation of medical students in the operating room by observing the various phases of a liver transplant is exceptionally enriching. The student witnesses the surgical, anesthesiologic and hematologic aspects such as coagulation and hemostasis and their eventual disorders that invariably occur along the procedure

Additionally, the student can witness hemodynamic disorders, hypovolemic shock and its control, acid-base disorders of different causes, and their proper correction. Hypothermic ischemia followed by normothermic ischemia with the blood reperfusion of the new liver, accompanied by eventual systemic repercussions, sharpens the careful observation of beginners.

The attention provided to the patient's family by the nurses and surgeons alternating in the ante-room of Central Surgery throughout the execution of the operation shows everybody, and undergraduate students in particular, the value of dealing with the relatives at an especially difficult time. Next, by seeing the patient leaving the operating room extubated in most cases, recovering from hours of anesthesia during surgery, motivates the student to study medicine from a multidisciplinary viewpoint in order to solve

problems concentrated in a single patient. Similarly, monitoring the patient during the postoperative period in the Intensive Care Unit and on the ward of the Liver Transplant Unit exposes the student to diverse clinical situations rarely encountered together in other specialties.

The types of diagnosis and the countless possibilities of treatment of infection, rejection, hydration disorders, acid-base balance, graft ischemia due to thrombosis of the anastomosed vessels, dysfunction of the liver graft, and the medical-surgical erudition required for a correct differential diagnosis between these disorders that frequently occur in a transplanted patient. Thus, the transplantation procedure offer to the student a vision not only of the technical aspects of analysis of imaging and biochemical laboratory exams, but also of the aspects of the doctor-patient relationship, extremely delicate in these cases, permitting him to participate in situations and discussions that are not often addressed during the medical course.

Additionally, aspects experienced in the entire dynamics of clinical transplantation may be questioned and tested experimentally in laboratory animals, eventually by the monitors but mainly by scientific initiation students (Table 1). Finally, liver transplantation, with its high complexity, incorporates and transfers technology and knowledge within the institution that performs it, from the viewpoint of patient care, research and education. Thus, it is a pedagogic tool that should be cultivated and stimulated with all kinds of encouragement.<sup>1-9</sup>

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## RESUMO

O programa de transplante de fígado presta-se, no dia a dia, de forma excelente, ao ensino de graduação, especialmente na forma de iniciação científica com trabalhos de investigação experimental em laboratórios ou na forma de monitoria formal em investigação experimental ou clínica. Nesta segunda modalidade, o aluno auxilia o professor orientador em atividades mais ligadas à enfermagem e centro cirúrgico, com trabalhos de acompanhamento clínico dos doentes, ou estudos de casos em investigações tanto prospectivas como retrospectivas. Cabe ao orientador, atribuir atividades balanceadas, cujos horários de execução não colidam com os formais da graduação. Da mesma forma, cabe ao aluno estruturar suas horas livres para dedicar parte delas ao exercício da atividade científica. Assim, o aluno de graduação, terá a oportunidade de vivenciar as mais variadas facetas do transplante, tendo dele a necessária visão sistêmica, à medida que seu conhecimento se amplia. A importância do transplante é exatamente esta, com o contato diário, ao longo do tempo, formar a idéia plena do todo a partir das complexas partes que o constituem, propiciando ao graduando participar de situações e discussões que não são freqüentemente abordadas durante a graduação.

**Palavras-chave:** Transplante de Fígado. Ensino Médico. Educação de Graduação em Medicina.

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