Brazilian Journal of Videoendoscopic Surgery

Original Article

Experience in Organizing a "Videosurgery Fishbowl" for Training Endoscopic Surgery at the 2007 and 2009 Congresses of the Brazilian Society of Endoscopic Surgery (SOBRACIL)

Experiência com a Estruturação de um Local de Treinamento em Videocirurgia ("Aquário de Videocirurgia") nos Congressos da Sociedade Brasileira de Videocirurgia (SOBRACIL) 2007 & 2009

MIGUEL P. NÁCUL[1], ELIAS COUTO ALMEIDA FILHO[1], CARLOS F. DILLENBURG[2], JAQUELINE BEHREND SILVA[3], GUILHERME BEHREND SILVA RIBEIRO[4], LAURA MOSCHETTI[5]

Sociedade Brasileira de Videocirurgia (SOBRACIL), CETREX – Brasília, DF e Extension Course in Videolaparoscopic Surgery of Hospital Parque Belém, Porto Alegre, RS.
[1] Titular Member of SOBRACIL. Local Coordinator of Training, IX Brazilian Congress of Videosurgery (SOBRACIL) 2009; [2] Titular Member of SOBRACIL. Local Coordinator of Training, VIII Brazilian Congress of Videosurgery (SOBRACIL) 2007; [3] Titular Member of SOBRACIL; [4] Surgical Resident in Urology, Hospital de Clínicas de Porto Alegre, Porto Alegre, RS; [5] Surgical Resident in Coloproctology, Hospital Nossa Senhora da Conceição, Porto Alegre, RS.

ABSTRACT

Introduction: Videosurgery has introduced profound changed in contemporary surgery. In order to perform it, videosurgery requires a structured learning process that is relatively complex. The variety and complexity of the procedures that the surgeon must master makes continuing education in videosurgery a requirement. **Material and Methods:** The project was carried out at the Brazilian Videosurgery Congresses organized by SOBRACIL that took place in the cities of Bento Gonçalves, RS, in 2007 and in Belo Horizonte, MG, in 2009. The objective was to offer congress attendees a setting in which to develop their skills in basic and advanced techniques in videosurgery, and to offer contact with equipment and instrument of different companies. **Results:** In the 2007 SOBRACIL Congress, there were 248 participants (18% of the Congress registrants). No evaluation of the activities during 2009 SOBRACIL Congress was conducted. The participants' level of prior proficiency in videosurgery varied. **Discussion:** In conducting a training in videosurgery it is clear that one is learning or relearning some motor skills. These should be acquired by training or practice supervised by skilled and experienced professionals. Taking a course where the surgeon learns the basic precepts and tries out new knowledge should seem fundamental. **Conclusion:** The "Videosurgery Fishbowl" made possible an initial basic training that is effective and of high quality, providing real world but supervised contact with the specific equipment and instruments.

Key words: Videosurgery, videolaparoscopy, training and learning.

Bras. J. Video-Sur, 2010, v. 3, n. 2: 078-085

Accepted after revision: February, 11, 2010.

INTRODUCTION

The introduction of microcameras in the first half of the 1980s establsihed the conditions for videolaparoscopic era which is usually said to have begun in 1987 with the cholecystectomy performed by Philip Mouret in Lyon, France. Videolaparoscopy set itself apart as a clearly therapeutic modality, in contrast to laparoscopy that was essentially diagnostic. Since then, videolaparoscopy has expanded its range of application, once limited to the abdominal cavity, but now applied to other parts of the human body. The great benefits of videolaparoscopy have been demonstrated, gradually expanding its indications, reaching beyond general surgery and the digestive tract, into other surgical specialties.

Videosurgery has introduced profound changes in contemporary surgery, and is now considered the "gold standard" for many surgical procedures. Technological advances, with

repercussions on the quality and on the variety of equipment and instruments, as well as improvements of surgical technique have led to a very rapid evolution of method, which has become highly specialized. Thus, in order for one to be able to perform these procedures, videosurgery requires a learning process that is well structured and relatively complex in character.

The variety and complexity of surgical procedures that the surgeon must currently master dictates a need for continuing education in videosurgery. The training of the surgeon in the method should be similar to the training of the surgeon in open surgery; i.e., in a service with a training system along the lines of a Medical Residency Program, taking into account specific pedagogic differences. Thus, ideally training in videosurgery should be done in stages, gradually and progressively in regard to the complexity of procedures, and under supervision and mentoring of a qualified professional. This should occur in a service with significant case volume involving the videosurgical techniques; the period of training should be sufficient to gain proficiency, and thus, obviously, extended.

In Brazil, videosurgery instruction is lacking both in medical school and in post-graduate medical training, including residency programs. These, when they have training in videosurgery, in general do not adequately and fully train the surgeon to carry out videosurgery. There exist, however, some centers of excellence in training in videosurgery, the majority not affiliated with institutions of higher education.

It is in this context that we proposed including an "express" training within the Congresses of the Brazilian Society of Videosurgery (SOBRACIL), using only "in vitro" simulation capabilities, as a way to demonstrate and to encourage congress attendees to pursue continuing education in videosurgery. Modeled on the experience developed at the Annual Meetings of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), the project grew out of a partnership and support developed among SOBRACIL, Training Centers engaged for several years in training in videolaparoscopic surgery (CETREX in Brasilia, DF and the Extension Course in Videolaparoscopic Surgery, Hospital Parque Belém [Bethlehem Park Hospital] in Porto Alegre, RS), and companies representing equipment and instrument manufacturers. Two introductory courses in videolaparoscopic surgery have already taken place during the last two scientific meetings of SOBRACIL in Bento Gonçalves, RS in 2007 and in Belo Horizonte, MG, Brazil in 2009. Both were blockbuster successes with congress attendees and the partner companies.

The project creates an environment in an enclosed area, but with large windows through which the congress attendees may observe their colleagues enrolled in the training going through the exercises. Because of the visibility and unusual nature of the project, it was christened with the name "Videosurgery Fishbowl". (Figures 1, 2 and 3)

The project makes available to physicians, residents and medical students a program that contributes to a better preparation for professional practice in this area of knowledge, particularly by encouraging the professional to seek a proper training in videolaparoscopic surgery.

MATERIALS AND METHODS

The project was implemented and refined at the Biannual Scientific Meeting (Congresses) of the Brazilian Society of the Videosurgery (SOBRACIL – Sociedade Brasileira de Cirurgia Laparoscópica) held in the cities of Bento Gonçalves, Rio Grande do Sul in 2007, and in Belo Horizonte, Minais Gerais in 2009. The training activities were conducted throughout the entire duration of the congress at no additional charge to meeting attendees who – due to the anticipated popularity –were merely asked to sign up in advance.

The goal of the project was to give meeting attendees a setting in which to practice basic and advanced techniques in laparoscopic surgery, useful in their day to day surgery. Moreover, with the supply of equipment and instruments by different companies, an ideal environment was created for both the exhibition of vendor's products and for participants registered for the course to evaluate them. The architectural layout proposed and developed for the training room in Bento Gonçalves in 2007 (Figures 4, 5 and 6) placed all the training stations, and therefore, the students, teachers and company representatives in one environment (which was referred to as the "Videosurgery Fishbowl"), with the equipment (racks) side by side. Adjacent to training facility was office space for a course secretary and a storage area for perishable material (pieces of pig liver, stomach and intestine). The training room also area an area for small lecture area with a projector).

Figure 1 *– activity in the "Videosurgery Fishbowl" 2007 SOBRACIL Congress.*

Figure 2 *– activity in the "Videosurgery Fishbowl" 2007 SOBRACIL Congress.*

Figure 3 *– activity in the "Videosurgery Fishbowl" at the 2007 SOBRACIL Congress.*

In the case of the Congress held in Belo Horizonte in 2009, for reason related to the venue, equipment (racks) of the different companies has to be place in separate environments (various "Fishbowls"), also called training stations. This spread out the training, and made the each station quieter and made it somewhat for the representatives of the exhibiting companies to exhibit and explain their products.

Pairs of students performed the exercises together alternating the role of surgeon and camera operator. Each of the five training stations had specific tasks to be performed, reflecting the type of equipment and instruments on display. Participants were given 10 minutes to perform the tasks at each station. Each pair was expected to have passed through the five stations and experienced the various activities and handled the equipment and instruments in approximately one hour. Each station had two racks with identical equipment and instruments, allowing the simultaneous passage of two pairs of students per station. Thus, twenty students – four per station – went through the Fishbowl hourly. At each training station there was at least one surgeon preceptor, and representatives of exhibiting companies. Equipment and instruments featuring new technological advances that did not conform to the proposed exercises at first four stations were demonstrated at the fifth station where their novel capabilities could be showcased.

The "Fishbowl" was also the setting for an Introduction to Videosurgery Course for medical students and a Knot and Sutures Course held during the 2007 SOBRACIL Congress in Bento Gonçalves, both with specific programming.

At both congresses, these Videosurgery Fishbowl functioned for four days with one or two four hour sessions per day. The course was open and free to anyone attending the Congress but required advance registration. The capacity of the "Fishbowl" was 80 students per shift (20 per hour), or 480 students in six four-hour sessions.Listen

EXERCISES DEVELOPED for the training stations ("Videosurgery Fishbowl")

1. **ENERGY SOURCES**

CONCEPT: To compare different energy sources for use in laparoscopic surgery.

OBJECTIVE: To use different forms of energy to cut and coagulate tissue in the videosurgery environment.

2. BASIC VIDEOSURGERY EXERCISES

OBJECTIVE: initial adaptation to working in a two dimensions with a monitor, grip training, laterality

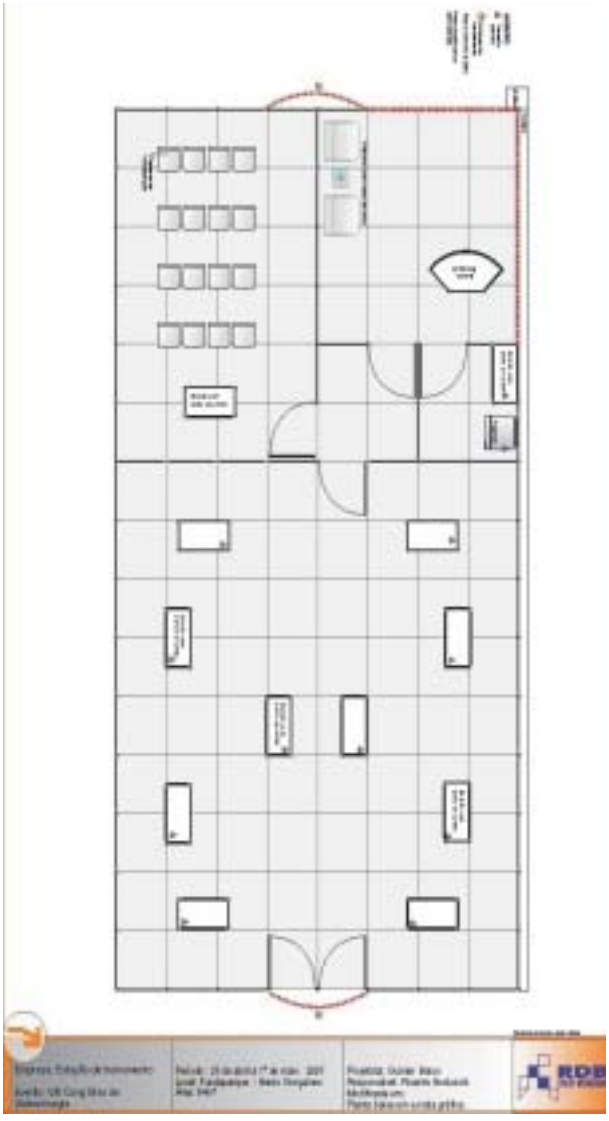

***Figure 4** – architectural design for the "Videosurgery Fishbowl" of the 2007 SOBRACIL Congress.*

and depth with emphasis on working simultaneously with both hands.

DESCRIPTION: sequence of exercises based on the "Top Gun" method described by ROSSER[1,2]

1. "Cobra Rope Drill"
2. "Pea Drop Drill"
3. "Terrible Triangle Drill"

3. ENDOSCOPIC KNOT

OBJECTIVE: training in intracorporeal surgical knots and stitches

DESCRIPTION: intracorporeal knot-tying.

4. ENDOSCOPIC SUTURE

CONCEPT: training the steps of an endoscopic suturing

OBJECTIVE: placement of suture needle into the cavity and to suture with simple intracorporeal and knots.

5. ENDOSCOPIC ANASTOMOSIS

CONCEPT: handle endostapler and achieve tissue approximation of porcine viscera using intracorporeal suturing and knot-tying.

OBJECTIVE: perform opening, position the endostapler adjusting its jaws, and achieve tissue approximation by intracorporeal suturing and knot-tying in porcine intestine or stomach.

EQUIPMENT AND INSTRUMENTS

Composition of each video rack (total: 10 racks):

· 01 Video Monitor
· 01 Micro-Camera

***Figure 5** – architectural design for the "Videosurgery Fishbowl" of the 2007 SOBRACIL Congress.*

***Figure 6** – architectural design for the "Videosurgery Fishbowl" of the 2007 SOBRACIL Congress – lateral perspective.*

· 01 "Black box" with its own light source
· 01 0º or 30º optic
Basic Instruments for each rack:
· 01 5 mm dissection (Maryland) forceps
· 01 5 mm gripping forceps without ratchet
· 01 Needle holder
· 01 counter needle holder
· 01 5 mm curved scissors
· 01 10 mm by 5 mm metal reducer
· Trocars for the "black box" (if needed – two 10 mm and one 5 mm)
Training Stations:
· Styrofoam Base
· Needles
· Scissors
· Pig organ (stomach, liver and intestines) and synthetic models that adapt to training specialties.

The organization of the first Videosurgery Fishbowl at the 2007 Congress involved the leadership of both the National SOBRACIL society and the Rio Grande do Sul chapter, with Dr. Carlos F. Dillenburg serving as course coordinator. For the 2009 Congress, the organization was performed by CETREX (Brasília, Brazil) in partnership with the Extension Course in Laparoscopic Surgery Video of the Parque Belém (Bethlehem Park) Hospital (Porto Alegre, RS). In the second edition, the idea was to homogenize the educational process of the "Fishbowl" by using centers (organizations) dedicated to training in laparoscopic surgery. In 2009, the project coordinators were Dr. Elias Almeida Couto Filho (Brasília, Brazil) and Dr. Miguel Prestes Nácul (Porto Alegre).

The corps of instructors was composed of surgeons skilled in laparoscopic surgery, with current teaching activity in laparoscopic training courses at the post-graduate level, assisted by residents from General Surgery services. Preceptors underwent a pre-course training in order to explain the teaching methodology being applied.

RESULTS

At the 2007 SOBRACIL Congress, 248 participants (18% of registrants of the Congress) availed themselves of the Videosurgery Fishbowl. 44% were medical students, 41% general surgeons, 8% gynecologists, 4% urologists, 1% gastroenterologists, 1% plastic surgeons and 1% proctologists. 15% of the participants said the activity exceeded their expectations, 68% said their expectations were fully met, and for 18% said their expectations were partially met. No evaluation of the training at the 2009 SOBRACIL Congress was conducted.

The level of prior proficiency in videosurgery among those who participated was varied, ranging from students with no prior training to surgeons certified in videosurgery with experience in high complexity procedures. The principal vendors of laparoscopic surgery equipment in Brazil: H. Strattner, Karl Storz, Olympus, Stryker, Partners, Taimina, Johnson & Johnson, Covidien, Edlo, Bhio Supply and Support participated in the project. Listen

DISCUSSION

The area of greatest focus in learning videosurgery is, without doubt, the psychomotor domain, which is related to doing (physical actions and movement).

"Motor learning" studies the mechanisms and processes underlying changes in motor behavior due to practice (training), from a state in which one does not dominate a skill until one is able to perform with proficiency as a result of a period of practice, a situation known as the learning curve.[4] Learning curves reflect a process of learning by doing. The basic idea of the learning curve is that, in the course of repeating a task, the time it takes to perform the task gradually decreases due to mastering of the skill. The learning curve, therefore, can be defined as a graphic expression of the period required to incorporate new knowledge. In practice, the criteria that have been used to define a learning curve is the time needed to perform a procedure and the number of procedures that the average surgeon needs to be able to perform the procedure independently with a reasonable outcome.Listen

In training in videosurgery it is clear that one is learning or relearning some motor skills.[3] These motor skills should be acquired by training or practice with the ultimate aim of achieving proficiency. Starting from movements guided by two-dimensional viewing they will reach a new order and consistency eventually becoming automatic.Listen

The learning process should be done in stages; it is obviously necessary to first become familiarized with and learn how to manipulate the videosurgery equipment and instruments. It is also necessary to adapt to changes related to vision and psychomotor skills required to operate in the laparoscopic environment, where one has to work with images

projected on a screen with a two-dimensional view, using long instruments that pass through fixed points. Psychomotor adaptation to this new work environment can be facilitated by various types of training. By requiring the movement be viewed in the operative field through a video screen, it is clear that the environment to be manipulated in videosurgery, with indirect visualization of the operative, is entirely different from that experienced by conventional or open surgery.[8]ListenRead phoneticall

For the novice approaching videosurgery, taking a course where the surgeon learns the basic precepts and tries out new knowledge should seem fundamental. Unquestionably, courses conducted using animals serve to reduce the learning curve in real surgical cases. As most of these courses are of short duration, additional training is recommended to develop more complex skills such as suturing. In addition, the first videosurgery procedures should be accompanied by a mentor.

Simulation using virtual reality, beside reducing the learning curve, have the proven ability to objectively evaluate the skills of surgeons.[6] The use of simulators is interesting of the growing ability to configure virtual situations similar to surgical procedures which increasing incorporate tactile sensation.[6] However, perhaps the greatest contribution of this type of equipment is the ability to assess, quantifying distinct levels of skill according to the surgeon's ability to execute surgeries of varying degrees of complexity.

Thus, training in videosurgery using a combination of synthetic models, experimental animals, and simulators in an organized program of instruction of varying duration have shortened the learning curve, making the apprentice videosurgeon less vulnerable to having complications or litigation during the learning process. Attaining a level of proficiency should minimize postoperative complications.

The experience of applying the "Top Gun" teaching methods[9] at the annual meetings of SAGES and the American College of Surgeons (ACS) in recent years revealed an interesting opportunity to merge the interests of medical societies organizing videosurgery congresses, congress attendees, and equipment companies to generate a structure that allows congress attendees to use equipment and instruments in a systematic manner, performing tasks with instructional validation in videosurgery.

Colleagues who attended international meetings, brought this experience Brazil and developed for the 1st South Brazilian Videosurgery Congress in 2006 in Gramado, RS a Knots and Sutures course which was conducted in one of the rooms of the congress. The event was very successful both from the standpoint of the interest by congress attendees – requiring the opening of another class at the same conference – as well as the structural, organizational and pedagogical quality of the event. From this experience emerged the idea of establishing a true "Training Center" in the exhibition area of the Brazilian Videosurgery Congress held in Bento Gonçalves in 2007.

The proposed objectives were: to provide knowledge about methods of training in videosurgery and about videosurgery equipment and instruments, arouse interest in the method, and to develop or enhance videosurgery skills. The project's success led to its repetition during the next SOBRACIL Brazilian Congress of Videosurgery, held in Belo Horizonte in 2009. The idea of this project is to consolidate a course structure and an instructional method that can be applied at various events with customization appropriate for different surgical subspecialties.

The sequence of training stations allows students to use the equipment under the guidance of preceptors with support provided by representatives of the exhibiting companies, who can provide relevant technical information about the products being used. The use of separate environments at the 2009 congress afforded students, tutors and companies at somewhat quieter setting in which to perform the activities. The training stations should, however, remain close to each other in order to preserve the real concept of the "Training Center". It is also important to situate the Training Center in the center of the exhibition fair, because it enhances the visibility of the project generating greater interest.

It is very important to apply technical concepts and a consistent instructional method which directly depends on good organization, preceptors who are engaged and competent, and active participation of the companies. The "Fishbowl" offers a space to observe the operation of equipment in real situations. It is therefore critical that companies not only provide their equipment and vehicles, but also that their representatives provide technical data and guide its proper use.

The idea of conducting comparative proficiency exercises among students with prizes/awards can heighten interest and increase traffic in the Training Center. Such competition is, in fact, one of the central concepts of the "Top Gun" method.

However, it is likely that such "exercises of confrontation", for example, assembling a puzzle or "the ultimate knot" task have more entertainment value than real educational impact. However, the playful side of the exercise should always be valued and tends to increase the interest of those attending the meeting. The evaluation of time required to complete each task and the number of errors can be used generate comparative scores. In neither of the congresses was the assessment of student performance according to the Because of the nature of the event and because any evaluation of the students have added to the complexity what the preceptors needed to do no evaluation of student performances was conducted at either the two congresses.

Having the student work in pairs is intended to mimic the real life videosurgery. The manipulation of the different videocameras with frontal (0°) and lateral (30°) view optics was designed to train navigation. The training time for each exercise – five minutes per individual and ten minutes per pair – was considered too brief by some students, but the intent was to offer the activity to the greatest number of participants.

The decision to outsource the instructional planning and execution of the project to Videosurgery Training Centers reflected a desire to have an appropriate and uniform instructional and training process using validated methods that were capable of delivering results and foster greater interest in training.

CONCLUSION

The project of developing a training place in the SOBRACIL Congress ("Videosurgery Fishbowl") seeks to embrace the experimental element inherent in videosurgery, creating an structured alternative in the form of training modules (stations), filling an existing educational gap at scientific meetings. Providing real world but supervised contact with the specific equipment and instruments, allows both the preceptor and the manufacturer (or their representative) to present their perspectives on the products.

With a team of professionals renowned in their fields, complete infrastructure, cutting edge technology, and a pedagogical approach in tune with global trends, the "Videosurgery Fishbowl" made possible an initial basic training that is effective and of high quality. It is clear that the main function of the course is to introduce videosurgery training both in relation to the initial development of specific skills as well as a metacognitive awareness derived by the training, encouraging the surgeon to seek appropriate opportunities to promote the safe and scientifically based practice of videosurgery. The ultimate goal of this teaching project is to disseminate the knowledge of videosurgery, promoting it the ongoing evolution and maintaining the highest standard of quality in surgery.

ACKNOWLEDGEMENTS

We thank the corps of preceptors who worked at 2007 SOBRACIL Congress and the 2009 SOBRACIL Congress, without whom it would have been impossible to conduct training that was competent and individualized. Our special thanks to Mr. Marcelo Pauli and Mr. Alexander Mango Stanislaus for their key role in organizing the activity.

RESUMO

Introdução: A videocirurgia introduziu profundas mudanças na cirurgia contemporânea. Para que se possa exercê-la, a videocirurgia requer um processo de aprendizado estruturado e de caráter relativamente complexo. A variedade e complexidade de procedimentos que o cirurgião deve dominar determinam a necessidade de uma educação continuada em videocirurgia. **Material e Métodos:** O projeto foi realizado nos Congressos Brasileiros de Videocirurgia da SOBRACIL realizados nas cidades de Bento Gonçalves, RS, em 2007 e em Belo Horizonte, MG, em 2009. O objetivo foi proporcionar aos congressistas um local de desenvolvimento prático de técnicas básicas e avançadas em videocirurgia, e de oferecer a oportunidade de contato com produtos e instrumentais de diferentes empresas. **Resultados:** No Congresso da SOBRACIL de 2007, houve 248 participantes (18% dos inscritos no Congresso). Não foi realizada avaliação da atividade durante o Congresso da SOBRACIL de 2009. O nível de proficiência prévia em videocirurgia dos inscritos foi variado. **Discussão:** Ao se realizar um treinamento em videocirurgia fica clara a necessidade da aprendizagem ou reaprendizagem de algumas habilidades motoras. Essas devem ser adquiridas pelo treinamento ou prática orientada por profissionais habilitados e experientes, parecendo fundamental a realização de curso onde o cirurgião aprenda os fundamentos e exercite os novos conhecimentos. **Conclusão:** O "aquário de videocirurgia" possibilitou um treinamento básico inicial efetivo e de boa qualidade, proporcionando um contato real e orientado com o equipamento e instrumental específico.

Palavras-chave: Videocirurgia, videolaparoscopia, treinamento e aprendizagem.

REFERENCES

1. Rosser JC Jr, Rosser LE, Savalgi RS. Objective evaluation of a laparoscopic surgical skill program for residents and senior surgeons. Arch Surg. 1998; 133(8): 911-912.
2. Smith CD, Farrell TM, McNatt SS, Metreveli RE. Assessing laparoscopic manipulative skills. Am J Surg. 2001; 181(6):547-550.
3. Cezário Melo. M.A. Questões relacionadas à Aprendizagem Motora na Videocirurgia. Rev Bras Videocir 2007.5 (2): 79-89.
4. Manilla JM. Taxionomia de los objetivos educacionais del area psicomotora: Educación Médica y Salud; 1971:5; 68-77.
5. Scheeres DE, Mellinger JD, Brasser BA, Davis AT. Animate advanced laparoscopic courses improve resident operative performance. Am J Surg 2004; 1888(2):157-60.
6. Grantcharov TP, Bardram L, Jensen PF, Rosenberg J. Learning curves and impact of previous operative experience on performance on a virtual reality simulator to test laparoscopic surgical skills. Am J Surg 2003; 185(2):532-40.
7. Daya S. Issues in surgical therapy evaluation: the learning curve. Evidence-based Obstetrics & Gynecology.2001; 3(2):57-8.
8. Nacul MP. Aspectos Atuais do Ensino da Videocirurgia no Brasil - Uma Análise Crítica (Editorial). Rev Bras Videocir 2004; 2(1): 1-4.
9. Rosser JC Jr, Rosser LE, Savalgi RS. Skill Acquisition and Assessment for Laparoscopic Surgery. Arch Surg. 1997; 132(2):200-204.

Correspondence address:
MIGUEL PRESTES NÁCUL
Rua Professor Cristiano Fischer 99, apartamento 1001
Bairro Petrópolis
Porto Alegre, RS, Brazil 91410-001
Tel.: 51 33385215
E-mail: miguelnacul@gmail.com