localized prostate carcinoma. Although the return to baseline of sexual function was quicker in the robotic RP group, the overall effects on urinary, sexual and bowel function were no different between open RP, LRP and robotic RP. Herman *et al.* [12] searched Medline for reports published between 1982 and 2007; they suggested that functional outcomes in the mid-term for LRP and short-term for robotic RP show *equivalence* to open RP.

To date, limited data from RCTs have failed to provide the high level evidence needed to show that urological laparoscopy in the upper urinary tract and pelvis is better. Recruitment to such trials will now be very difficult. This will place a strong emphasis on QoL studies to answer these questions and thus avoid personal bias and marketing forces driving surgical decision-making. We argue for a more rigorous approach to the analysis of upper tract laparoscopy and perhaps more importantly, the issue of laparoscopic pelvic surgery, particularly with regard to subjective outcome. More research is certainly needed to assess the appropriateness of the SF-36 in evaluating surgical outcome in these patients.

CONFLICT OF INTEREST

None declared.

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Abbreviations: **RCT**, randomized controlled trial; **QoL**, quality of life; **L(LD)N**, laparoscopic (live-donor) nephrectomy; **SF-36**, Short Form-36; **(L)RP**, (laparoscopic) radical prostatectomy.

A MODULAR APPROACH FOR TRAINING UROLOGISTS IN LAPAROSCOPY

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INTRODUCTION

Currently the field of laparoscopic urology faces a problem shared by several other surgical subspecialities, i.e. the problem of how to safely and adequately deliver the initial phases of training in laparoscopic procedures to the next generation of urologists. As surgical education becomes evidence-based, by addressing learning theory in the development of training regimens, there is a growing need for mentors with a background in educational science, skilled in the effective delivery of knowledge, and who recognize the needs of individual trainees to ensure a supportive environment for acquiring skills [1]. Because of the improved clinical outcomes, there are increasingly many patients who choose to be treated laparoscopically. However, urological societies (e.g. in Denmark and the UK) have faced difficulties in training the new generation of urologists skilled in laparoscopic surgical approaches, because of the few surgeons available to offer laparoscopic training. In 2004, the BAUS presented guidelines for urological laparoscopic training in the UK [2]. According to these guidelines, the training of laparoscopic urologists should be rooted in simulation and augmented with intraoperative experience. Specifically, these guidelines suggest that training should combine 'hands-on' practice of basic

FIG. 1. Curve 1 shows a hypothetical trainee 1 who received a course in advance in laparoscopic surgery and can be a more proficient surgeon faster than trainee 2, who learns gradually. While both trainees eventually reach the same level of performance, the shaded areas represents the increased performance of trainee 1 over trainee 2.

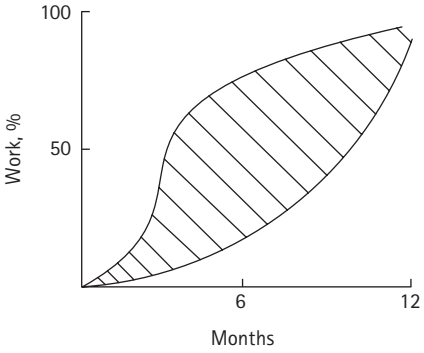

FIG. 2. A laparo-trainer being used at a course in the laboratory at Foulum, Denmark.

laparoscopic skills, consisting of practice on low- and high-fidelity bench models, assisting in and observing various laparoscopic urological procedures, in addition to an advanced skills course with operative experience on cadaver or animal models, rather than solely relying on a log-book system that records the numbers of procedures performed or assisted [3]. Thus, the primary contribution of this new guideline is the formalized introduction of simulation to augment the traditional approach to training laparoscopic skills [4]. We think that effective simulation-based training must consist of three elements, i.e. the simulator(s), the curriculum (with validated assessment methods) and the educator. Accordingly, BAUS has provided adequate guidelines for two of these three elements, and it states that centres with a higher volume of cases report better outcomes [5]. Figure 1 shows a schematic of two hypothetical learners. The first learner uses a traditional training approach and takes longer to reach proficiency. The second learner uses simulation and training before performing surgery in the operating theatre [6]. Note that while this individual ends up with the same level of proficiency as the traditionally trained surgeon, he/she is performing at a higher level earlier. It is postulated that this improved performance earlier in training might not only improve patient safety, it might also translate into economic savings, because surgery done by pre-trained trainees is completed more quickly and efficiently [7].

A very successful model of simulation-based training for laparoscopic surgery was developed at the University of Toronto, Ontario, Canada. The Surgical Skills Centre at Mt. Sinai Hospital provides very extensive simulation-based courses in laparoscopic surgery [4]. The Centre offers a wide variety of simulators that are supported with a curriculum that has developed over the past decade. The unique aspect of the Surgical Skills Centre is that it cooperates with the Wilson Centre for Research in Education (both Centres are affiliated with the University of Toronto) to train a new generation of surgeons/scientist/educators. These surgeons (some still in training, others already certified) are trained in educational theory and educational research methods, while pursuing either a Masters in Education or Doctoral graduate degree and simultaneously obtaining the Wilson Centre Fellowship. This model of cooperation between a training centre and an educational research centre is one to emulate.

There is an important constraint that must be considered for trainees in Denmark. There is currently legislation limiting the number of hours a trainee can work per week, making the need for efficient education critical. In Denmark a new model was recently developed for the training of laparoscopic skills. In 2005, a 'brick-less' (virtual) minimally invasive development centre (MIDC) was created among the regional hospitals to secure a standardized level of training for the next generation of laparoscopic surgeons. The MIDC encompasses a region with a population of 1.6 million. This virtual network consists of two teaching universities and 10 county hospitals. The success of this new programme is ensured by three guiding principles: (i) an agreement on the basic theoretical concepts and practical laparoscopic skills between surgery, gynaecology and urology; (ii) collaboration between the specialities to ensure innovation in education; and (iii) research to continuously evaluate the programme and the quality of training., Specifically, a structured modular laparoscopic skills course that encompasses the principles of self-directed as well as guided learning has been developed. This course is intended to facilitate the development of laparoscopic dexterity in the junior trainee [8], and with additional training, significantly improve laparoscopic operative performance. To date this approach has not been formalized in Denmark. Using this approach the trainee can gain a high level of skill before operating on real patients in the operating theatre [9,10]. These improvements can be accomplished in a cost-effective curriculum that is intended to enhance the surgical education of residents and speed the acquisition of competent operative skills.

On the initial assessment of regional programmes, the variation in the quality of education directed at teaching laparoscopy was large. Although there are several bench-top simulators at all the regional hospitals, as well as three experimental virtual-reality laparoscopic simulators, and three surgical animal laboratories that are shared, the format of education, including the curriculum, had not been standardized throughout the network. In response to this variation, a steering committee with members of the different surgical specialities and the government was called to ensure there is a strategic development and implementation of standardized simulation-based curriculum.

In reaction to a clearly articulated need, the MIDC purchased portable laparoscopic trainers (transportable 'black-boxes', Linea Medical, Denmark) to facilitate independent practice of technical skills in the early stages of learning (Fig. 2). The trainees are encouraged to borrow and take home the portable trainers, to practise independently before the expert-guided learning portion of the course. In addition the trainees receive a package with readings, access to relevant web-sites and a CD-ROM with expert instruction identifying various laparoscopic exercises. This concept is novel to the programme, and its efficacy is currently being experimentally evaluated. The expert-guided learning format consists of four modules. Module 1 is a 2-day course where all the trainees receive expert guidance on the performance of the same skill set that was

practised independently. The technical performance before and after the module is assessed to provide the trainee with feedback. Module 2 is a 3-day animal course, teaching advanced procedures, and including a CD-ROM with expert demonstrations of the operations the trainees will be performing. This Module also includes an evaluation of technical skills before and afterward. The next step in this programme, in cooperation with the society of each speciality, is the development of Modules 3 and 4, which will involve the implementation of a log-book system that will record details of actual procedures assisted, supervised and performed. By training in the laboratory, it is assumed that the individual trainees will improve their technical skill and proficiency. Our research group is currently involved in a research programme aimed at objectively evaluating this assumption.

In conclusion, the training and implementation of minimally invasive surgery demands resources. With support from the governing bodies and funding, a 'brick-less' centre (MIDC) has been launched in two regions in Denmark. The purpose of this centre is to teach laparoscopic skills with the innovative use of simulation. An ongoing process of evaluation will reveal the effectiveness of this educational programme. If shown to be effective, this approach could be applied globally in terms of what is being taught, and where it is being taught. For example, in Canada the Northern Regions could adopt this distributed approach that uses independent learning to teach fundamental technical and clinical skills to trainees in remote areas.

CONFLICT OF INTEREST

None declared.

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Abbreviation: **MIDC**, minimally invasive development centre.

FOURNIER'S GANGRENE: THE DEVELOPMENT OF A CLASSICAL PATHOLOGY

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Necrotizing fasciitis, especially when termed Fournier's gangrene (FG) when it initiates at the perineum, is a rare but rapidly progressive subcutaneous tissue infection characterized by extensive necrosis. Although it has been known for more than a century and considered as a cause of death, the basic medical principles have not changed for many years. We discuss what is new in the evaluation of this enigmatic pathology and speculate about its clinical metamorphosis. We reviewed reports of FG in the English language. The clinical characteristics of FG have been changing; atypical locations of necrotizing fasciitis, e.g. in the head and neck, and the incidence of patients with FG but no predisposing factors, has been increasing. While the role of anaerobic bacteria in FG is decreasing, that of atypical organisms is increasing, and thus hyperbaric oxygen therapy will probably cease to be a common treatment. We think that FG will not be as likely to cause death in future.

KEYWORDS

necrotizing fasciitis, Fournier's gangrene, development, treatment

INTRODUCTION

Necrotizing fasciitis is a rare but rapidly progressive fascial and subcutaneous soft-tissue polymicrobial infection, characterized by extensive necrosis due to the microthrombosis of small subcutaneous arterioles. This life-threatening infection is termed Fournier's gangrene (FG), when it is initiated in scrotum or perineum, as first described by Alfred Jean Fournier in 1883 [1]. The infection probably begin to spread through Buck's fascia and then along the planes of the dartos fascia of the scrotum and penis, Colles' fascia of the perineum, and Scarpa's fascia of the abdominal wall. Erythema, pain and swelling are often the presenting symptoms, accompanied with