

Transforming a conventional theatre into a gynaecological endoscopy unit

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Summary

Objective: Most minimally invasive procedures are now performed in operating rooms that were originally designed for traditional open surgery. We designed an endoscopic theatre based on our experience with special features specific for gynaecological endoscopy. **Method:** We designed a detailed plan with an architect's aid of a gynaecological unit (based on a Greek presidential decree published in 1991). The space utilized was that of a conventional theatre. **Results:** With the architectural plan we anticipated every area needed in a gynaecological endoscopic theatre. A twin theatre was considered appropriate in order for the surgical team to operate alternatively in one theatre while the other is being cleaned and prepared for use. **Conclusion:** The design of a unit dedicated to gynaecologic laparoscopy is a multidisciplinary task where the endoscopic surgeon undertakes an active and prominent role. It is a project with great benefits and rewards for all parties involved. We present our design for evaluation.

Key words: Gynaecological endoscopy unit; Theatre design; Laparoscopy; Endoscopy; Ergonomics.

Introduction

The explosive development and acceptance of gynaecological endoscopy has led to a large number of procedures that are carried out under endoscopic conditions. For those procedures, special equipment and instruments are needed as well as a unit dedicated to gynaecological endoscopy that takes into account the differences between the classic and the endoscopic approach. Robotics in the operative suite, such as the Hermes or Zeus robotic consoles, provide the surgeon with innovative tools [1]. Although it is feasible for the surgeon performing a minimally invasive procedure to talk through a headphone to the Hermes robot, the vast majority of the gynaecological endoscopic units cannot afford this kind of equipment or facility. Most endoscopic procedures still take place in a conventional theatre as limitations in hospital budgets do not allow a purposely built minimally invasive theatre suite. The specific installation requirements of surgical endoscopy, as well as the technological progress needed for this surgical technique justify the need for new organization of the operating theatre.

The new operating room is especially designed to fit and satisfy the requirements of a modern operating theatre, where surgical laparoscopy and hysteroscopy play a major role [2]. If a hospital is willing to provide such a theatre, a minimally invasive surgeon is expected to be actively involved in the design process, although he might be lacking experience for a project of this magnitude. Apart from the actual endoscopy rooms, waiting areas for patients and relatives, a reception area, a resuscitation area, changing rooms, toilet facilities, staff

offices, and technological and sanitary equipment storage areas have to be anticipated.

We present the design of an endoscopic theatre based on the Greek government's recommendations and our unit's experience. The design of the theatre including measurements for each room is presented. A detailed arrangement of the installation of all areas regarding the number, the size and allocation is given. No such venture was found in our scrutinized literature review.

Material and Method

A detailed plan of a unit dedicated to gynaecological endoscopy was designed with an architect's aid, based on the Greek presidential decree of December 24, 1991. The space utilized was originally a standard conventional theatre. The importance of the general layout of an operating suite is to maintain high hygienic standards. The suite is planned using a zone system so that the hygienic standard increases towards the centre, i.e., reaching the highest standard in the operating and adjacent rooms. Consistent with the recommendations of the Medical Research Council [3], the theatre suite is divided into four different zones. These include: (a) a *protective zone* including an entrance lobby, recovery rooms and changing rooms; (b) a *clean zone* including anaesthetic rooms, scrub-up rooms and inner lobby; (c) a *sterile zone* including operating rooms, sterilising rooms and lay-up rooms; and (d) a *disposal zone* including sinks. We applied the same guidelines to the endoscopy theatre suite.

Results

With the architectural plan we projected areas for patient reception, a waiting area for relatives, nursing staff office, anaesthetic review room, medical records, doctor's room, changing area, recovery, a twin endoscopy suite and a non sterile zone (dirty zone).

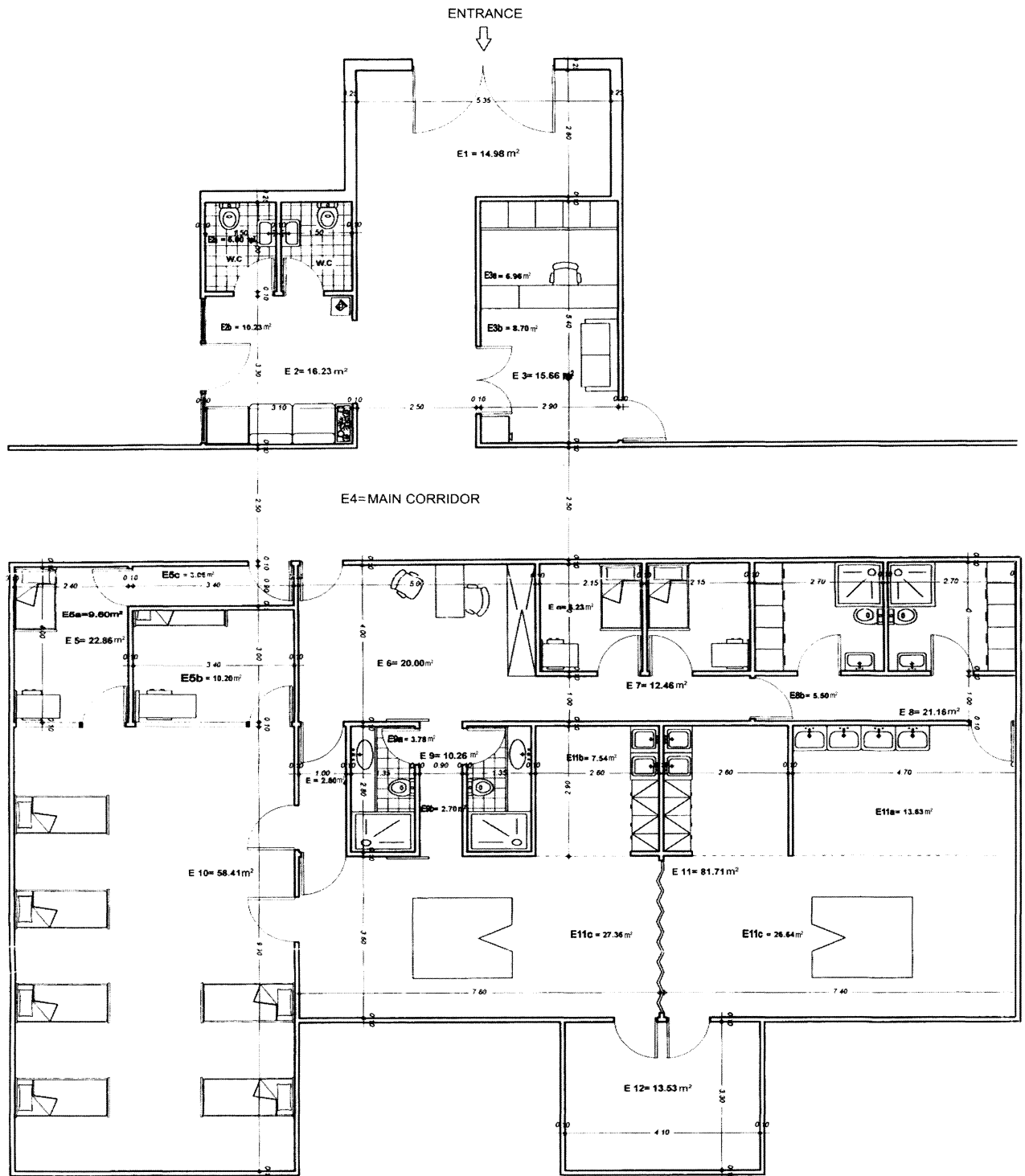


Figure 1. — Alignment of the endoscopic suite areas.

Operating facilities should be organized as a two-theatre suite with shared facilities, so that the surgical team can operate alternatively in one theatre, while the other is cleaned, sterilized and prepared for the next procedure. The operating rooms have access to the corridor where the scrub-up facilities for the operating team are

placed, to the recovery area and to an exit area which is shared by the two theatres (dirty zone) [4].

To optimize the work flow in the minimally invasive suite, equipment controls must be located appropriately to minimize the movements of the circulating nurse. A small mobile desk would improve the theatre's ergonomics

Table 1. — Metric measurements of the gynaecological endoscopy suite.

E1: Entrance = 14.98 m ²
E2a: WC = 6 m ²
E2b: Relatives waiting area = 10.23 m ²
E3a: Nurses station/reception = 6.96 m ²
E3b: Patients waiting area = 8.70 m ²
E4: Main corridor
E5a: Nursing/staff office = 9.60 m ²
E5b: Anaesthetic review room = 10.20 m ²
E5c: Corridor = 3.06 m ²
E6: Medical records = 20.00 m ²
E7: Doctors office = 6.23 m ² (x2)
E8a: Changing area = 3.78 m ² (x2)
E8b: Corridor = 2.70 m ²
E9a: Patients wc = 3.78 m ² (x2)
E9b: Corridor = 2.70 m ²
E10: Recovery = 58.41 m ²
E11a: Scrub area = 13.63 m ²
E11b: Sterile store = 7.54 m ² (x2)
E11 c: (twin) Endoscopy theatre = 27.36 m ² + 26.64 m ²
E12: Dirty zone = 13.53 m ²

as the circulating nurse would perform paper charting functions while facing the patient and operating team. Access to the patient is improved by the replacement of equipment carts with overhead booms so in case of an emergency, equipment booms can be quickly swung away from the operative field to facilitate access. A table-mounted Mayo stand on a universal ball joint over the head of the table serves a dual purpose of protecting the patient's head while providing a convenient instrument resting place for the surgeon. This stand can quickly swing out of the way if anaesthesia requires urgent access to the patient's airway [5].

In this kind of unit the theatre to recovery bed ratio is 1:3, while the classic theatre to recovery bed ratio is 1:1 [6]. Thus the increased workload due to the shorter duration of some procedures, and the fact that some procedures will be performed as outpatient cases, can be accommodated. The recovery area needs direct access to the intensive therapy unit/high dependency unit and the radiology department [7]. The anaesthetic and nursing staff rooms have an uninhibited view of the recovery area to facilitate continuous postoperative monitoring of patients. Figure 1 demonstrates alignment of all areas, while the actual measurements are presented in Table 1.

Conclusion

The design of a unit dedicated gynaecological laparoscopy is a multidisciplinary task. Most potential problems can be avoided by establishing in advance a clear line of communication between architects, engi-

neers, surgeons, hospital management and the Infection Control Committee, and this should be maintained throughout the planning, construction and commissioning stage [7]. In every step of the procedure, the active involvement of the leading minimally invasive surgeon is critical.

Theatre accommodation can be predicted by considering the number of surgical beds, bed occupancy, throughput and the likely caseload per session. The rapid recovery associated with endoscopic procedures should be kept in mind as well as the growing number of indications and patients suitable for endoscopic management. Due allowance should be made for use in emergencies and for regular maintenance. It is a false economy to underestimate the requirements since extension in a preexisting theatre is likely to be very expensive. It is therefore preferable to round up the number of rooms required, even if this introduces some delay in theatre provision [7].

The use of theatres is changing with the increased use of minimally invasive surgery, and many procedures previously undertaken there (i.e., endoscopies) are now performed in specialist departments [8]. Transforming a conventional theatre into a gynaecological endoscopy suite is a feasible project with great benefits for surgeons, patients, and the hospital unit. It will be interesting to see how the design of operating rooms responds to these and other forthcoming changes. Our proposal is presented for evaluation.

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