NARRATIVE REVIEW

Surgeons and ethical challenges in operating room

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Abstract

Ethics lie in the heart of professionalism. In surgery, it represents an essential element, with surgeons facing ethical challenges in their routine practice. The rapid expansion of surgical technology and innovation along with the use of resources and consideration of conflict of interest have brought up the need for the development of current surgical code of ethics. Operating room represents a stressful environment where patients' lives depend upon careful preparation, planning and execution. The progression of surgery within the operating room must be done in harmony and in line with the ethical principles of autonomy, beneficence, non-maleficence and justice. Discussion of ethical problems arising in the operating room is not a common subject in surgical literature. The current narrative review was planned to cover ethical concerns related to patients' safety and privacy in the operating room and some of the evolving topics, like ethics of overlapping surgery, live surgical broadcast and 'do not resuscitate' policy in the operating room.

Keywords: Surgical ethics, Operating room, Overlapping surgery, Live surgery broadcast, Safety, Privacy.

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Introduction

Surgeon-patient relationship forms the core of surgical ethics. Operating room (OR) represents a stressful environment where patients' lives depend upon careful preparation, planning and execution.[1] The progression of surgery within OR must be done in harmony with others involved in the care of patients. Since medical ethics, in general, and OR ethics, in particular, are not taught to the trainees and surgeons, this deficiency is reflected in their clinical practice throughout their professional career. The current narrative review was planned to highlight the ethical problems arising in the OR, and their solutions in the light of literature and guidelines. The review was done by the Urology and Cardiothoracic Surgery section at the Aga Khan University Hospital (AKUH), Karachi, and comprised literature published between January 2007 and June 2021 that was searched on electronic databases PubMed, Science Direct, Google Scholar and Embase. Only English-language full-text articles were selected for the review.

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Patient's privacy in OR

Patients undergoing surgery are quite apprehensive about their dignity and fear of compromised privacy. Privacy is considered to be a complex concept having multiple elements that are difficult to break down.[2] It is generally defined as having a control of oneself with full autonomy. An anaesthetised patient is extremely vulnerable. It is, therefore, particularly important for the OR personnel, including surgeons, nurses, anaesthetists etc., to safeguard a patient's autonomy and display patient's rights on OR premises to ensure that the patient's dignity and privacy is being maintained, protected and promoted.[3] This also requires attention to the environment and professional attitude, as everyone should feel responsible to challenge the abusive and disrespectful attitude towards the patient, and activities and actions of a colleague that may compromise a patient's privacy.[4]

Further insight into the patients' rights to autonomy will lead to questioning the presence of observers or spectators whether they are part of medical team for education and training or industrial representatives providing technical assistance. This can potentially lead to a breach of patient's confidential information, but this may be resolved by way of informed consent beforehand.[5] Video recording of a surgical procedure, although another source of teaching, training and review, has the potential to compromise a patient's privacy.[6] Similarly, the exploded usage of closed social media group (CSMG) in real time by sharing posts in the form of comments and videos to improve surgical education and achieve desirable outcome is another potential source of compromising confidentiality. However, beneficial usage of CSMG done with constructive intent to share de-identified data is supported by certain medical societies with emphasis on following regulations to comply with the Health Insurance Probability and Accountability Act (HIPAA) and seeking informed consent wherever deemed necessary by the surgeon.[2]

Patient's safety in OR

Safety of the patients is another major aspect of surgical

practice. Operating room is a place where healthcare providers from different disciplines may face confrontation, and it is important to display professionalism and show respect towards colleagues to facilitate achieving best quality care with the highest level of safety.[3] The surgical team has tremendous pressure to carry out the procedure as planned and the anaesthesiologist remains busy providing acute care which in itself is a crucial task. Their performance depends on effective team-work and an uninterrupted environment, as interruptions have the potential of being risk factors for errors.[7] Patient-OR interaction is a unique phase of healthcare where the patient is defenceless and exposed to potential harms by improper equipment, instruments, medicines, lights, temperature and staff along with poor decision-making. Similarly, desirable surgical outcomes require a safe and conducive environment free of disruption, interruption and distraction (DID) to enhance concentration towards the completion of a procedure with safety. It is evident that adverse events due to unavoidable human errors result from flaws in the system and inadequacies in organisational frameworks.[8]

In a systemic review, McMullan et al.[7] examined the relationship of DIDs with operative duration, team performance, individual performance and patient safety outcomes in terms of surgical-site infections (SSIs), and found that DIDs were associated with negative outcomes. Similarly, Cohen et al.[8] indicated that the infiltration of personal electronic devices disengage the attention from the primary task, compromising the safety and increasing the margin of error.

It is imperative to have processes in place like intraoperative checklist by the World Health Organisation (WHO) and surgical timeout to ensure closed loop communication and to promote safety with reduction of adverse surgical outcomes.[9,10] Strong professional commitment, team-work and effective implementation of these checklists will help achieve improved safety.

Concurrent and overlapping surgeries:

The terms overlapping surgery (OS) and concurrent surgery (CS) are used to describe the involvement of a single surgeon for two or more surgical procedures simultaneously. Also used interchangeably, these terminologies refer to different practices. In contrast to a sequential start case, where overlap of exposure in one case occurs with the closure of another case, in OS, the primary surgeon responsible for operating two or more patients is present for all critical and key portions, while in CS, he is not available for those portions of surgical procedures.[11]

In multidisciplinary procedures, OS is common with one specialty surgeon present only for a specified portion requiring a particular surgical expertise, such as a urologist providing flank/retroperitoneal exposure to a spine surgeon operating on the lumbar spine later.

Across the globe, healthcare has become a complicated industry driven by corporate culture with multiple stakeholders, such as healthcare institutions, doctors, insurance companies and others. In this culture, efficiency is measured by numbers; the number of patients served and operated, with less focus on good clinical outcomes and quality. The practice of OS and CS was established to improve this efficiency.[12]

Literature evidence for overlapping surgery: In the past few years, there has been a surge in literature regarding CS and OS, with the areas of focus being the difference in various outcomes like safety of the procedure, healthcare cost, impact on residents' training and perioperative data.[13]

Data regarding comparison of serial cases versus OS has shown that OS is a safe practice and does not lead to significant differences in patient outcomes.[13,14] Theriault et al.[13] analysed 18 published studies incorporating more than 1.2 million surgical cases out of which ~5% were OS cases. Parameters such as procedure time, reoperation rates, length of hospital stay and re-admission rates were not significantly different between serial and OS cases. Kent at al.[14] surveyed the perceptions of 1454 patients regarding OS and found that only 4% patients were aware of the practice, and 69% expressed opposition to it.

The hype regarding overlapping/simultaneous surgery was created after the publication of an article in October 2015 in the Boston Globe[15] describing a case where a patient became quadriplegic at the Massachusetts General Hospital (MGH) following a spine surgery performed by a surgeon who was involved in another complex surgical procedure at the same time. The case was investigated and the jury found that the surgeon had failed to inform the patient about his plans to operate on more than one patient at a time. This case generated a strong emotional debate, and patient right advocates questioned hospitals' practices and raised concerns about CS.

Issues and ethical concerns with overlapping surgery: There are ethical concerns both in favour of and against OS practices. OS/CS permits efficiency by maximising the OR space utilisation, decreasing waiting times and lowering the hospital vacancy with increased patients' access to specialised surgical care. It also provides autonomy to residents and fellows by facilitating them to perform non-

critical surgical operations.[13,16] It can be less efficient for the anaesthesia team and could expose patients to prolonged time of anaesthesia.[11] Running simultaneous ORs have potential risks, such as exposure of patients to potential complications and poor outcomes due to unsupervised surgery indicating failure on the surgeons' part to adequately train the residents.[17] The motivation behind OS and CS might be due to a desire to maximise revenue and potential billing fraud by a surgeon.

OS can have substantial professional, ethical and legal concerns. The ethical aspects include what is the critical portion of a particular case and who defines it, who is a qualified practitioner, and what are the special situations where a surgeon should obtain informed consent for OS.[12,17]

As modern surgery is team-work, the American College of Surgeons (ACS) and other organisations have laid down evidence-based and consensus review processes and have formulated guidelines. These guidelines have emphasised that OS is appropriate and is unlikely to have negative effect on patients' safety, but CS/simultaneous surgeries should not be conducted.[12] The fundamental difference between OS and CS is the key/critical portion of the surgery which the ACS has defined as "stage(s) or part of the procedure associated with complexity or risk, where essential technical expertise and surgical judgments are necessary to achieve the optimal patient outcome".[12]

The ACS has mentioned that although the primary attending surgeon is responsible for the case, the professional may delegate part of an operation to qualified practitioners, such as follows, residents, surgeon assistants, anaesthesiologists, nurses or another attending under his/her direction.

Corrective actions: Healthcare organisations should review and update their policies about OS and CS with due assurance of compliance with these policies. System-specific guidelines for OS and CS should be formed by multidisciplinary committees with the involvement of administrators, patient safety experts and OR personnel, and these policies should be made with specific areas of focus, like defining the 'critical/key portion' of every indexed surgical procedure, and who should be allowed to perform non-critical components without supervision.[17] This also includes documenting the surgeon's OR entry and exit times. In the United States, the Centre for Medicare and Medicaid Services (CMS) billing policy states that a teaching surgeon can bill for OS only if the professional was present during the 'critical portion' of procedure and was 'immediately available' during the entire procedure or arranged for another qualified surgeon.[18]

Theriault et al.[13] devised the term Mandatory Attending Portion (MAP), defined as the minimum portion of a surgery that the attending surgeon needs to be physically present for. This is the most technically challenging and demanding portion of a surgical procedure. The governing principal is that it should not go simultaneously with MAP of another procedure. Another area that needs pre-defined MAP in OS is multidisciplinary surgery with the involvement of two or more surgeons from different specialties in one case, such as inferior vena cava (IVC) tumour thrombectomy by a vascular surgeon in a complex radical nephrectomy case performed by a

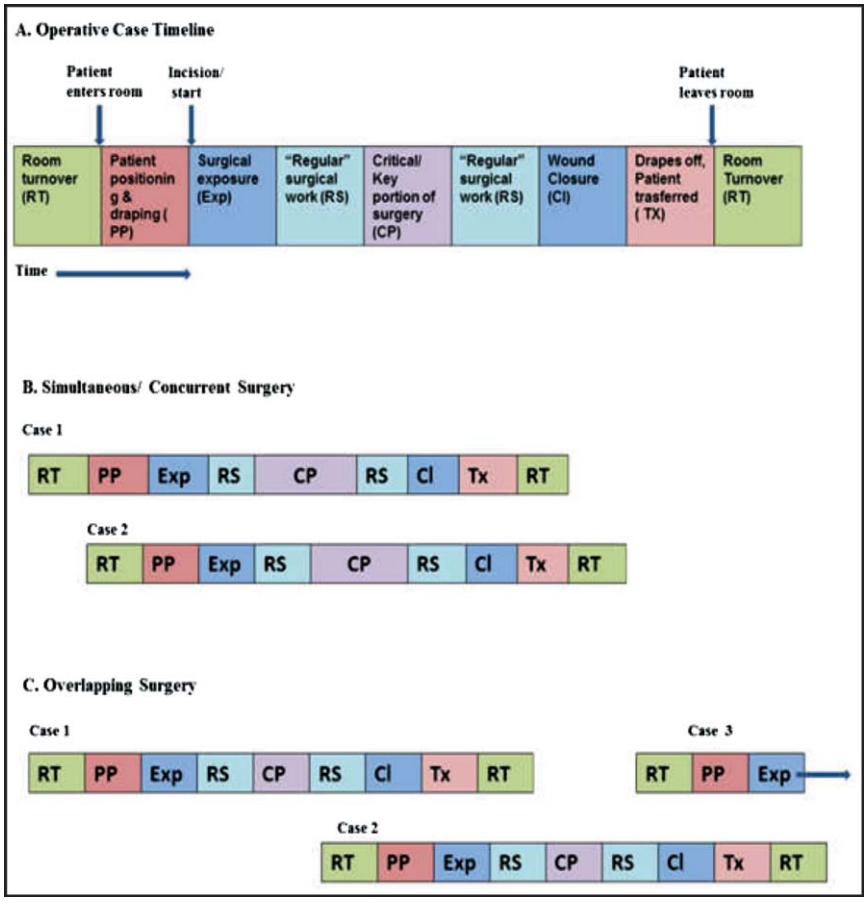

Figure: Conceptual layout of surgical case-flow in the operating room: A) Timeline of an operative case. B) Simultaneous/Concurrent Surgery. C) Overlapping surgery.

urologist where each specialty's MAP should be pre-defined[13] (Figure).

Ethical principles governing overlapping surgery and concurrent surgery: These involve elements like autonomy and informed consent, beneficence, non-maleficence and Justice.

Autonomy and informed consent: The trusting relationship between the surgeon and patient and/or his family gives them the assumption that the primary surgeon will perform the entire operation. Patients should be given the understanding of OS possibility, so they would not only have fewer concerns with OS, but also have the option of deciding to seek care from another surgeon or at a later time.[12,17]

Beneficence: This principle requires the surgeons to assure that their actions are consistent with patients' values, needs and agreed-upon treatment. The primary surgeon should be capable of maintaining focus on each patient's surgery in case of OS.

Non-maleficence: It stipulates that the surgeon's actions/or failure to act do not harm the patient. The surgeons should be available for critical/MAP portions and should have a sound knowledge of their team members' skills and maturity to do an unsupervised surgery.

Justice: This principal requires that the surgeons treat all patients irrespective of their religions, cast, gender, cultural background and ability to pay.

Live surgery broadcast (LSB)

Surgeons who are also part of the academia have the responsibility to transfer their skills, knowledge and experience to others. With the technological advancement, live surgery is no longer limited to the people in the same OR.[19] Since the first live surgical broadcast (LSB) in 1996 demonstrating laparoscopic cholecystectomy during a surgical conference, it has now become a growing trend in international surgical meetings.[19] In LSBs, an experienced surgeon demonstrates his/her techniques to the audience comprising students, colleagues and peers. This activity helps to improve intervention, and generate discussion with the aim of knowledge dissemination and ultimately improving the patient's outcome. With the fast-paced advancement of telecommunication system and audio-visual (AV) technologies along with the implementation of intrinsic video-optic elements of endoscopic, laparoscopic and robotic systems, high-quality images are relayed in real time to remote sites.[19-21] Thus LSBs, particularly for minimally invasive procedures, have increased exponentially.[21]

Merits of live surgery: LSB helps to improve the collective knowledge of many observers during a conference and, hence, constitutes a form of research in a way that a new technique/skill is being disseminated and could contribute to generalisable knowledge.[20] Its benefits include training of less experienced surgeons; real-time interaction of audience with the panel of experts to learn various surgical options and improvement in decision-making; and observation of expert skills during challenging and complex cases performed using modern devices and equipment.[22]

The performing surgeons stand to benefit in terms of gaining knowledge and professional experience, and the ability to develop creative solutions to problems during a procedure. It can also improve surgical education, especially for niches like endovascular surgery and paediatric urology, where small case load is a training limitation.[23]

Brunckhorst et al.[22] in a systematic review studied LSBs and their safety and impact on training. They found that LSBs fulfilled the educational value criteria, such as feasibility, acceptability, construct and concurrent validity. Another recent systematic review by Carbonara et al.[19] identified 46 studies from 6 specialties, including urology, interventional cardiology, gastrointestinal (GI) endoscopy, GI surgery, ear-nose-throat (ENT) and ophthalmology. They assessed the patient outcome reporting, current use of LSBs, development of LSB, and educational value. They found that almost all the studies did not show a higher risk of complication or worse outcome.

Ethical concerns and disadvantages of live surgery: Despite it's educational benefits and popularity, many concerns have been raised regarding LSBs.[21,24] There is an increased risk to patients during LSBs due to frequent interruptions and the risk of infection from both broadcast crew and unnecessary equipment. There is violation of medical secrecy as patients' dignity and privacy are compromised and their identification and confidential record may be revealed to the audience.[20,24] Many a time, the patients do not even know about who is going to perform the surgery and whether the procedure will be filmed or broadcast. They can be put on standby/prolonged anaesthesia mode before smoother broadcasting starts. They are at the risk of possible cancellations and scheduling of procedure to fit within the time limits of the meeting.[20]

Many factors can affect a surgeon's performance during a live surgery. Surgeons travelling to perform a live surgery in a conference can experience travel-related fatigue, jetlag, unfamiliar working environment or sub-optimal operating conditions that may adversely affect their technical and judgment abilities.[25] Working in an environment with communication/language barrier might increase the anxiety and can affect patient outcome.[24] Unfamiliar equipment and devices provided by sponsoring and marketing companies for promotion during LSBs could also lead to potential hazards for patients. Undue noise and distraction could compromise a surgeon's concentration, vision and could impair professional dexterity.[24] Surgeons have undue psychological stress due to scrutiny by the panel and the audience, and by the obligation to answer questions during the procedure. The visiting surgeon is often not aware of subsequent patient outcome or any complications that may arise in due course.[23]

Regulations and recommendations for LSBs: Following the death of a patient undergoing aortic aneurysm repair during an LSB in Japan, a number of institutions and associations have revised their policies and have evaluated their practices.[26] The Royal College of Surgeons in the United Kingdom made specific recommendations about LSBs during its meetings, with special emphasis on patient safety.[27] Many societies have proposed good practice guidelines for LSBs. The European Association of Urology (EAU) LSB guidelines recommend that live surgery should be performed under a strict code of conduct, with transparency regarding all the steps of the event and its outcomes. The central theme should be "the right surgeon, the right patient, the right environment and the right intentions".[28]

Brunckhorst et al.[22] and Carbonara et al.[19] in their systematic reviews identified 13 guidelines and policy statements by major surgical societies[28,29] and the Royal College of Surgeons[27] (Table).

Solutions to potential problems of LSBs: The core ethical principles of the Belmont report, i.e. respect for persons, beneficence, justice and, especially, principles of patient's autonomy and safety, must be applied.

LSB should not be regarded as clinical practice, but rather a form of clinical research and, hence, must be subjected to institutional review board (IRB) approval, including conduct under a written protocol with clear objectives and procedures designed to reach those objectives.[27,28]

A senior surgeon should be assigned as "patient's advocate" who needs to be present in the OR, could speak for patient's right and should have no conflict of interest. The 'advocate' should be able to stop unnecessary delays and terminate the link in case of any complications or even the entire surgery if it is felt that the patient's best interest is compromised.[20]

The performing surgeon should take active part in case-selection and decision and discussion with the patient, the family and the host team, and must familiarise with equipment, environment and personnel beforehand.[17]

Ethical principles governing LSBs: These include four critical elements. The first of which is respect of patient's autonomy. An open and honest communication should be done with the patient and the family. Specific informed consent for broadcast should be obtained with complete explanation of potential risks. The extent of transmission should be to a limited and registered audience only.[24]

The second element is beneficence. The surgeons should consider patients' wellbeing rather than their own conflict of interest, such as financial gains, access to sponsorships

Table: Common elements reported in live surgery guidelines.

Domain	Remarks
General	• Live procedure demonstrations should not be used for marketing or commercial opportunities for the physician, host institution or equipment used in the procedure
	• The educational value must exceed a pre-recorded operation
Patient	• Patient safety comes first and the surgeon must be willing to terminate the live broadcast if this becomes compromised
	• The patient's privacy must be preserved at all times
	• Patient should sign a separate consent for live surgery broadcast
Surgeon and Surgical team	• Live broadcasts should be performed at a surgeon's home institution where possible
	• A moderator between the audience and surgeon should be used to prevent questions distracting the surgeon at key steps
	• Surgeon must be willing to terminate the live surgery broadcast as needed
	• Surgeons should consider performing only procedures with sufficient experience and expertise
	• Surgeons should strongly consider bringing their own team and equipment while performing live surgery in another (host) hospital
	• Non-essential people must not be present in the OR at the time of surgery
	• Surgeons should not participate in the broadcast where non flexible schedules limit the duration of procedure

and advancement of their own careers and reputations.

The third element is non-maleficence. The patient might face additional delays in receiving the treatment due to a particular date of LSB and, thus, there can be delays in treatment. During the event there can be intraoperative delays and standby anaesthesia which can be potentially hazardous for the patient.

The final element comprises justice, fairness and equality which decides who will receive the indicated treatment by an expert and who will not.

Alternatives to LSBs: An alternative educational tool to LSB is a semi-LSB which is a pre-recorded video of a surgical procedure with minimal editing. It can be advantageous as videos can be paused or played back, and the audience can ask questions to the panel of surgeons while eliminating the ethical problems pertaining to the patients, such as safety and privacy, and those pertaining to the surgeons, such as anxiety and distractions, and other issues mentioned above.[21]

In a systematic review by Carbonara et al.[19] the perceptions of surgeons performing the LSB or semi-LSB were evaluated. Both modalities were perceived to be equally valuable, but 38% felt that the complication rate was higher with LSB.

'Do Not Resuscitate' (DNR) code in OR

These are the orders finalised for certain patients based on strong indication to do so, like patients with terminal illnesses and diseases with poor prognosis. Ethical principles in accordance with the law not only respect patient's rights, but also authorise them to exercise their autonomy to consciously opt for DNR.[30] This statement, though legally valid and taken after discussion between patients, family and physicians, creates a paradox when these patients land up with surgical problems of acute nature or for symptom palliation, like surgical intervention for intestinal obstruction, fixing a bony fracture, performing tracheostomy or gastrostomy, and similar other procedures. The issue of DNR becomes conflicting as most of the management deployed by the anaesthetist is, in fact, resuscitative in nature and, hence, it is essential to have 'suspension of DNR orders' only to be restored when the acute care is over.[31] It has both ethical and clinical implications as patients may develop cardiac arrest as a result of anaesthetic or surgical intervention(s) and the condition is reversible with cardio-pulmonary resuscitation. An individualised decision without compromising the institutional policy is mandatory to adopt a holistic approach in the management of such patients whenever they require surgical intervention in the OR.[32]

Conclusion

Surgeons face potential ethical problems in OR which could be daily issues or complex situations requiring decision from limited available options. The surgeons should not only be skilled in the science and art of surgery, but should be cognisant of the ethical and moral problems and their solutions in the OR. Adherence to the ethical principles in OR creates a sense of responsibility among surgeons and a sense of trust, privacy and autonomy among the patients, which together can get translated into improved clinical outcomes.

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