



Royal Australasian College of Surgeons

Research & Evaluation, incorporating ASERNIP-S

Concurrent or overlapping surgery - Report



Introduction

The Royal Australasian College of Surgeons (RACS), is responsible for training surgeons and maintaining surgical standards in Australia and New Zealand. As part of the RACS role in maintaining high surgical standards in Australia and New Zealand, it has come to the attention of RACS that internationally there has been a move towards the practice of overlapping or concurrent surgery. This practice has been the source of some controversy in the United States and RACS, as a peak body for surgeons in Australia, is seeking to understand the practice of overlapping surgery and the issues associated with it so that it can provide its fellows with an up-to-date and informed position on the practice. This discussion paper summarises contemporary evidence and opinions on this practice.

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Plain language summary

Overlapping surgery is sometimes called concurrent or simultaneous surgery but these terms are not interchangeable. Overlapping surgery refers to the situation where two procedures overlap in their start and end times, sometimes by more than an hour, but where the 'critical' portions or those activities which require the skill and expertise of the primary surgeon do not overlap. This is a planned activity in which the primary surgeon has made the decision that the procedures that are to overlap are safe to perform in this manner and that appropriate supporting or back-up staff are available.

Simultaneous or concurrent surgery is when the primary surgeon is responsible for the 'critical' portions of two procedures that are happening at the same time. There is consensus from both the American College of Surgeons (ACS) and others that, except in an emergency situation, simultaneous surgery is not appropriate.

Overlapping surgery is reportedly a common practice in the United States (US), particularly amongst orthopaedic surgeons. Proponents of the practice state that it improves efficiency, increases the opportunities for staff training and allows more patients timely access to skilled surgeons. These benefits have not been studied in the literature; however, it is intuitive that increased throughput per surgeon might have efficiency gains for the hospital. Furthermore, there are recognised problems around the world with long waiting times for some elective surgery.

Those who are concerned about overlapping surgery feel that the practice may pose additional risk to a patient. In extreme examples there have been allegations that primary surgeons have left patients under anaesthesia longer than expected, left the operating theatre for extended times in the hands of less experienced surgeons, and, planned overlapping surgery of a level of complexity and duration that is not appropriate. These examples are understood to be the exception rather than the norm; however, they highlight a need for institutions who allow their staff to undertake overlapping surgery to do so in an explicit and well-reasoned policy framework.

The limited peer-reviewed literature on overlapping surgery has come from institutions in which this practice is long established and this literature consists entirely of retrospective comparisons across overlapping versus non-overlapping surgery at single institutions or institutional networks. None of the literature found that overlapping surgery was less safe than non-overlapping surgery. No literature quantifying or characterising the benefits of overlapping surgery from the perspective of the institution, surgeon and patient was identified. The available evidence does not support the claim that overlapping surgery is unsafe. However, there is also no known evidence to commend the practice in terms of efficiencies, training gains or patient needs – all factors that should be considered by institutions considering overlapping surgery.

Despite the recent attention given to overlapping surgery guidance for surgeons on how to approach informed consent is somewhat limited. Recent updates to the ACS Standards on Principles stipulate that patients should be informed of the different types of professionals who will participate in their surgery and their roles, and that if an urgent or emergent situation arises that requires the surgeon

to leave the operating room the patient should subsequently be informed.¹ This guidance is not explicit about whether patient's should be informed that the primary surgeon will leave the OR for a planned overlapping surgery; and, if this should be disclosed at what time point prior to the surgery should this be discussed. A previous position statement from RACS on this issue asks surgeons to consider *'Have I explained my practice to my patient, and do I have informed consent?'*.

In a broader sense informed consent is a often challenging as many studies have consistently indicated that patients often receive incomplete information or do not understand the information they have been given. Some surgeons do not believe that patients need to know that their surgery is a planned concurrent surgery – however, there have been notable cases in the United States in which patients finding out after the fact have been understandably distressed and pursued litigation.

As one Orthopaedic surgeon points out

"When I undergo an orthopaedic operation, I want my surgeon to perform the entire operation. I accept the fact that assistant surgeons will work with my attending surgeon, but I want him or her to be at the operating table providing or coordinating my care. I think that most patients share this perspective. In my opinion, that is doing the right thing."

(Healy 2016)

At the very least, if institutions are planning to engage in overlapping surgery then there should be a consistent understanding of whether this should be disclosed, and at what point. Furthermore, it should be considered whether a patient who is uncomfortable with overlapping surgery will have alternatives at that institution.

Irrespective of individual differences in opinion regarding overlapping surgery the recent controversy has highlighted the fact that there, up until recently, has been little consensus or oversight regarding this issue. It is important to note that hospitals differ substantially in their size, level of staffing, the patients they serve and the complexity of procedures they perform and so what is safe and appropriate in one context may not be safe and appropriate in another. The conversation around overlapping surgery underscores a need for serious deliberation on:

1. Whether overlapping surgery is appropriate in the Australian context?
2. If so, under what circumstances?
3. What are the Australian definitions of, and standards for, overlapping surgery?

¹ Exact wording: *"As part of the preoperative discussion, patients should be informed of the different types of qualified medical providers that will participate in their surgery (assistant attending surgeon, fellows, resident and interns, physician assistants, nurse practitioners, etc.) and their respective role explained. If an urgent or emergent situation arises that require the surgeon to leave the operating room unexpectedly, the patient should be subsequently informed."* The American College of Surgeons. (2016, 12 April 2016). "Statements on Principles." Retrieved 16 December, 2016, from <https://www.facs.org/about-ac/s/statements/stonprin#ii>.

4. How would 'critical' portions of a surgery be identified, and do these need to be organisationally defined or is appropriate to leave this to the discretion of individual surgeons?
5. What does informed consent look like with respect to overlapping surgery? What information does the patient need to make an informed decision?
6. When should discussions about overlapping surgery start?
7. Do patients need education materials provided regarding overlapping surgery?
8. What procedures need to be in place to ensure that overlapping surgery occurs in accordance with accepted definitions?
9. What data hospitals should collect to inform on the benefits and harms of overlapping surgery?

Public and professional controversy

In the US there has been debate around the practice of overlapping surgery—in which an attending surgeon is responsible for multiple procedures in multiple operating rooms at the same time for at least a portion of the procedures. According to news sources, in particular the Boston Globe ‘Clash in the name of Care’ spotlight report these are a fairly common practice and are permitted at many teaching hospitals (The Boston Globe Spotlight Team 2016). Whilst there is broad acceptance that in the setting of emergency and trauma surgeons may be involved in multiple cases at the same time, the idea of planned overlapping surgery has caused substantial concern and debate.

In October 2015 The Boston Globe published a 12,586-word investigative report on the practice of overlapping surgery at Massachusetts General Hospital (MGH) in Boston. This report appears to be the centrepiece in an ongoing discourse about the practice of overlapping surgery. The article focuses on the case of Tony Meng, a 41-year old man with a degenerative condition constricting his spinal cord resulting in pain and sensory symptoms. The surgery he was scheduled for to alleviate his chronic back pain resulted in sudden paralysis. On reoperating his surgeon identified that his spinal cord had somehow bent at an acute angle and was protruding through a hole in the dura (The Boston Globe Spotlight Team 2016).

In this instance Meng was one of two patients operated on by the same primary surgeon whose procedures overlapped for reportedly seven hours. In both cases the surgeon in question was present for the most challenging components of surgery and was assisted by a general surgeon and two surgeons in training. Prior to surgery neither Meng nor the other patients were aware that their primary surgeon was operating on two individuals whose operating room time overlapped (The Boston Globe Spotlight Team 2016). There is no direct evidence that the overlapping nature of the surgery caused his paralysis; however, this case has spawned both public and professional controversy. In particular it raises the following questions:

- What are the obligations of the surgeon to a patient with respect to informed consent?
- Is it acceptable for a surgeon to be responsible for two overlapping procedures? And if so, under what circumstances is it acceptable?
- Is overlapping surgery a safe practice?
- Are outcomes affected by the overlapping nature of procedures?

Proponents of overlapping surgery believe that overlapping surgery facilitates patient access to highly skilled surgeons and increases efficiency. They claim that highly skilled surgeons performing concurrent surgery deliver superior overall care outcomes. Further to this they posit that it may also expand opportunities for surgical training via the graduated delegation of responsibility to assistant surgeons (McAlister 2015, Yount, Gillen et al. 2015, Hyder, Hanson et al. 2016, Mello and Livingston 2016, The Senate Finance Committee 2016, Zhang, Sing et al. 2016).

Those who oppose overlapping surgery believe that current approaches to patient consent are inadequate and argue that there is little data available to evaluate its effect on outcomes (The Boston Globe Spotlight Team 2016). Many also hold the view that the practice is simply unacceptable in terms of a surgeon’s responsibility to their patients (The Boston Globe Spotlight Team 2016). Overall there is no reliable data available to inform the question of how frequently

overlapping procedures occur in the United States (The Senate Finance Committee 2016) or within Australia and New Zealand, although it has recently come to the attention of RACS that the practice does occur in some settings in Australia.

What is concurrent versus overlapping surgery?

The nomenclature around the practice of concurrent or overlapping surgery is varied. However, it is vital to the understanding of its implications that certain scenarios be defined. The first important concept is the distinction between critical and noncritical portions of surgery.

Critical portions are those portions of a surgery that require the essential technical expertise and judgment of the primary surgeon to achieve the optimal patient outcome (The American College of Surgeons 2016). These portions are difficult to define explicitly and definitions of critical portions state that the primary attending surgeon is the individual best placed to know which portions of an operation are critical.

Noncritical portions are elements of the surgery that the primary attending surgeons does not believe to require their specific technical expertise or judgment – i.e. they are comfortable delegating those tasks to an individual of less experience. Tasks commonly cited as noncritical include patient positioning, wound closure and initial incisions.

The distinction between critical and noncritical portions of surgery is the basis of the argument for the acceptability of overlapping surgery. Figure one shows different configurations of concurrent or overlapping surgery and has been reproduced from an opinion piece by Alexander Langerman (2016).

This figure illustrates the difference between staggered, overlapping and concurrent surgery – each scenario has different implications for risk management and efficiency. In **staggered surgery** cases (A) the start and end time of cases that a surgeon is responsible for do not overlap. In **overlapping surgery** (B and C), the primary surgeon is responsible for the critical portions of both procedures and both procedures overlap to a substantial degree, however, the critical portions of those procedures do not overlap. In examples D and E **simultaneous or concurrent surgery** are illustrated (Langerman 2016). This is where critical portions of the procedures for different patients overlap. It is common consensus that simultaneous/concurrent surgery is not appropriate except in exceptional circumstances such as emergencies (Hyder, Hanson et al. 2016, The American College of Surgeons 2016, Zhang, Sing et al. 2016).

This report is concerned primarily with the practice of **overlapping surgery** as there appears to be broad consensus that in most instances concurrent surgery is not appropriate.

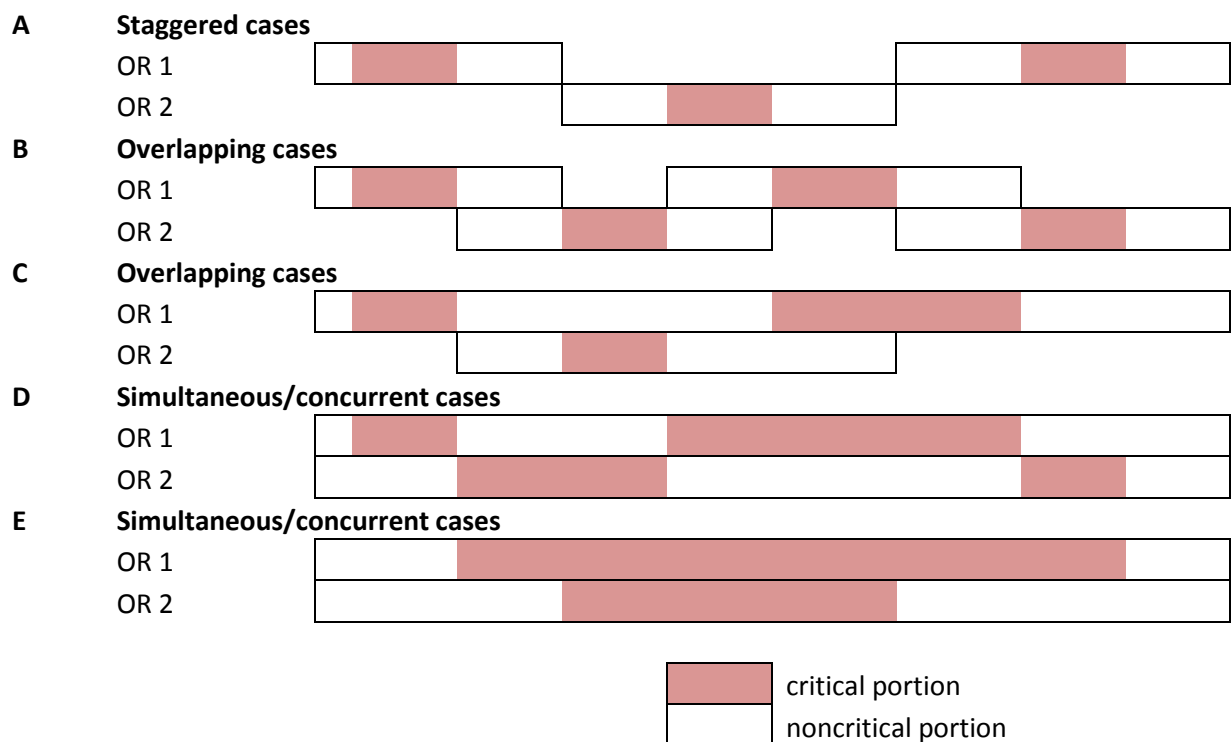


Figure 1 Differentiating staggered cases, overlapping cases and simultaneous/concurrent cases (Langerman 2016)

The American College of Surgeons in their Statements on Principles gives the following guidance as to when overlapping surgery is appropriate:

“The primary attending surgeon is personally responsible for the patient’s welfare throughout the operation. In general, the patient’s primary attending surgeon should be in the operating suite or should be immediately available for the entire surgical procedure. There are instances consistent with good patient care that are valid exceptions. However, when the primary attending surgeon is not present or immediately available, another attending surgeon should be assigned to be “immediately available.”” (The American College of Surgeons 2016)

According to the ACS acceptable overlap of two distinct operations by the primary attending surgeon occurs in two general circumstances.

*“The first and most common scenario is when the key or critical elements of the first operation have been completed, **and there is no reasonable expectation that the primary attending surgeon will need to return to that operation.** In this circumstance, a second operation is started in another operating room while a qualified practitioner performs noncritical components of the first operation—for example, wound closure—allowing the primary surgeon to initiate the second operation. In this situation, a qualified practitioner must be physically present in the operating room of the first operation.*

*The second and less common scenario is when the key or critical elements of the first operation have been completed **and the primary attending surgeon is performing key or***

critical portions of a second operation in another room. In this scenario, the primary attending surgeon must assign immediate availability in the first operating room to another attending surgeon.

(The American College of Surgeons 2016)

The American College of Surgeons also considers concurrent surgery to be inappropriate.

Literature and reports

Evaluating the outcomes of overlapping surgery

Experience from the Mayo Clinic (Hyder, Hanson et al. 2016)

The most recent, and most comprehensive, report comes from the Mayo Clinic which retrospectively analysed the safety profiles of overlapping and non-overlapping surgical procedures at a large tertiary referral centre. The authors characterise overlapping surgery as the situation where one surgeon is responsible for two procedures performed at the same time where the critical portions of those are not coincident.² Concurrent procedures, where the critical portions of two procedures overseen by the same physician at the same time are not permissible at the Mayo clinic. This data represents the best available evidence regarding the outcomes of overlapping surgery and it provides an analysis that included a broad range of surgical specialties.

The primary analysis included adult patients who underwent elective, inpatient surgical procedures from January 2013 to September 2015 and whose data was available through the University HealthSystem Consortium³. A separate analysis was also conducted using patient data from patients whose data contribute to the American College of Surgeons- National Surgical Quality Improvement Program (ACS-NSQIP). Excluded patients were those with ASA scores of V or VI or for whom data was missing or for whom it was unclear whether procedures were overlapping or non-overlapping. The authors matched all overlapping procedures of a specific type to all non-overlapping procedures of the same type. For the primary analysis the two main clinical outcomes were inpatient mortality and length of stay. In the cohort for whom ACS-NSQIP data were available the 30 day major morbidity was also examined. The authors also compared overlapping and non-overlapping patients with respect to (Hyder, Hanson et al. 2016):

- the percentage of patients reporting the top performance scores for a hospital consumer assessment system;
- the duration of operation; and,
- The anaesthesia time.

Overall the sample contained 10,765 overlapping procedures of which 10,614 were matched to 16,111 non-overlapping procedures. Of overlapping cases 46.6 per cent had overlap of at least 60 minutes or 50 per cent of the operative duration. The UHC cohort included higher-risk inpatient procedures relative to the ACS-NSQIP cohort which consisted of 25% outpatient patients with a lower global risk. Risk adjustment was performed using externally constructed measure of patient

² According to the authors “each surgical specialty operates in dedicated operating room cores with multiple surgeons of the same specialty present throughout the business day; therefore, second surgeons are available to assist when needed. After normal business hours of 5 pm, weekends, or holidays, a surgeon will identify by name a surrogate surgeon when performing cases with overlap occurring. Surgeons are permitted to exit and re-enter when performing overlapping surgery so they can be present for all critical periods. These analyses examine the safety outcomes of overlapping surgery and not concurrent surgery, as the latter, where the critical portions of 2 cases under the supervision of a single surgeon overlap in a portion or in their entirety, is not allowed at Mayo Clinic excepting the most extreme emergencies.”

³ This is a consortium of > 100 hospitals that serves as a standardised data collection mechanism for inpatient administrative data. The Mayo clinic was able to identify their own centre data through records.

estimated risk however authors noted that groups did have an unbalanced casemix between overlapping and non-overlapping surgery. The key findings of the study were:

In the UHC cohort:

- When adjusted for case-mix, surgeon, and predicted mortality the adjusted odds ratio of inpatient mortality was greater for non-overlapping procedures (2.14, 95% CI 1.23 to 3.73, $p=0.007$). However, when looking at the ACS-NSQIP cohort this difference was not seen.
- Length of stay was not significantly different between overlapping and non-overlapping procedures.
- The patient experience rating scores were not significantly different between groups.

In the ACS-NSQIP cohort:

- No outcomes were statistically significant for between group comparisons.

The table below summarises baseline information about participants and predicted risk of mortality and estimated length of stay. Main outcomes in the two groups are also reported. The authors did not identify a greater risk of harm to patient who underwent overlapping surgery, and the authors conclude that from their analysis there is no reason to think that patients should feel that they are trading safety for access if offered overlapping surgery. The Mayo Clinic is clear that it has allowed surgeons the option to undertake overlapping surgery for some time now and they claim that this practice facilitates greater patient access to their skilled surgeons (Hyder, Hanson et al. 2016). With respect to the data presented from the Mayo clinic it is relevant to note that the Mayo Clinic has a very long tradition of excellence in healthcare and may have infrastructure and staffing support that is not available at other centres. It is important to consider that the institutional framework in which overlapping surgery takes place has implications for its risk to benefit profile.

Table 1 Baseline data and outcomes from overlapping and non-overlapping surgery (Hyder, Hanson et al. 2016)

	University HealthSystem consortium cohort		ACS-NSQIP cohort	
	Overlapping (n=10,614)	Non-overlapping (N=16,111)	Overlapping (N=3,712)	Non-overlapping (N=5637)
Preoperative factors				
Age, y, mean (SD)	60.4 (15.3)	60.3 (15.6)	59.5 (14.9)	58.1 (15.8)
Sex, N (% female)	5,034 (47.4)	7,575 (47.0)	1,859 (50.1)	3,034 (53.8)
ASA-PS III or IV, N (%)	4,850 (45.7)	7,286 (45.2)	1,235 (33.3)	1,722 (30.5)
Registry estimated mortality mean (SD)	0.0076 (0.0221)	0.0107 (0.0392)	0.0035 (0.0119)	0.0025 (0.0058)
Registry estimated LOS mean (SD)	5.0 (3.5)	5.2 (4.3)	NA	0.048 (0.054)
Surgical specialty, N (%)				
Cardiovascular	1,401 (13.2)	1,454 (9.0)	0 (0.0)	0 (0.0)
Colorectal	650 (6.1)	1,443 (9.0)	215 (5.8)	340 (6.0)
General	912 (8.6)	2,157 (13.4)	588 (15.8)	1,102 (19.5)
Gynaecological	454 (4.3)	394 (2.4)	291 (7.8)	423 (7.5)
Neurosurgery	1,303 (12.3)	1,370 (8.5)	386 (10.4)	381 (6.8)
Oral surgery	72 (0.7)	154 (1.0)	0 (0.0)	0 (0.0)
Orthopaedics	3,566 (33.6)	6,035 (37.5)	1,023 (27.6)	1,796 (31.9)
Otorhinolaryngology	341 (3.2)	191 (1.2)	368 (9.9)	359 (6.4)
Plastic and reconstructive	105 (1.0)	188 (1.2)	99 (2.7)	209 (3.7)
Reproductive	1 (0.0)	28 (0.2)	0 (0.0)	0 (0.0)
Thoracic	729 (6.9)	915 (5.7)	117 (3.2)	164 (2.9)
Trauma	38 (0.4)	67 (0.4)	25 (0.7)	24 (0.4)
Urology	630 (5.9)	1,245 (7.7)	428 (11.5)	684 (12.1)
Vascular	412 (3.9)	470 (2.9)	172 (4.6)	155 (2.7)
Outcomes				
Anaesthesia duration mean (SD)	278.8 (131.0)	232.2 (120.1)	248.3 (122.5)	202.7 (103.5)
Operative duration mean (SD)	193.6 (117.3)	152.8 (103.7)	173.8 (110.0)	132.0 (88.3)
Actual mortality, N (%)	31 (0.3)	131 (0.8)	7 (0.2)	8 (0.1)
LOS, mean (SD)	4.6 (6.0)	5.3 (10.3)	213 (5.7)	2.2 (3.3)
Morbidity, N (%)	NA	NA	213 (5.7)	213 (5.7)

ACS-NSQIP: American College of Surgeons- National Surgical Quality Improvement Program; ASA-PS: American Society of Anaesthesiologists physical status; LOS: length of stay.

Experience from an ambulatory orthopaedic centre (Zhang, Sing et al. 2016)

Zhang et al (2016) investigated the outcomes of patients who had overlapping surgery and compared them to the outcomes of patients who did not have an overlapping surgery. The study was conducted using data from an ambulatory orthopaedic surgery centre and included 3,640 cases.

Of those cases 68 per cent were overlapping procedures, defined cases for which the same attending surgeon had a separate case in a different operating room that had an overlapping room time. The degree of overlap ranged from less than 15 minutes to more than two hours. Approximately half of all cases had less than one hour of overlap. The authors considered outpatient duration of stay, postoperative complications, unplanned readmission, unplanned reoperation and emergency visits. The authors report that at baseline patients were not significantly different in terms of age, sex, body mass index, BMI, American Society of Anaesthesiologists physical status rating or specialty.

Overall the authors report that there were no significant differences between overlapping and non-overlapping surgery in terms of:

- Procedure time
- Anaesthesia time
- Total operating time
- 30-day complications
- Unplanned readmission
- Unplanned reoperation

Analysis of the rate of complications for the overlapping surgery cohort showed cases with more than 2 hours of overlap had the highest rate of complications (3%) – although this did not reach statistical significance. However, as pointed out by the authors, ambulatory orthopaedic procedures are generally considered to be low-risk surgery with low complication rates. Patients treated in an ambulatory setting might be healthier overall than those treated as inpatients and the majority of cases in this series were sports medicine procedures. Hence, how applicable these results might be to the inpatient setting is unclear (Zhang, Sing et al. 2016). This article highlights that, although not explicit, surgeons are likely to exercise their judgment in terms of patient selection for planned overlapping procedures. This article seems to suggest that most procedures that are planned to overlap would be unlikely to include high risk patients or complex surgery.

Experience in the cardiothoracic setting (Yount, Gillen et al. 2015)

Yount et al (2016) published a conference abstract entitled '*Attendings' Performing Simultaneous Operations in Academic Cardiothoracic Surgery Does Not Increase Operative Duration Or Negatively Affect Patient Outcomes*'. Although the full detail of the study is not available the abstract reports results from a review of the operative log from all cardiothoracic operations performed at their institution from July 2011 to July 2013. The definition of simultaneous surgery is not provided; however, the author's state that operations were categorised based on whether the attending was 'simultaneously supervising two surgeries'. They report that a total of 1,748 cardiac and 1,800 general thoracic surgery cases were reviewed and the cases were done by 6 surgeons across 20 different operation types. Although very little information is reported the authors state that there were 'no statistically significant differences in observed for risk-adjusted outcomes in any category'. The authors conclude that the practice of running simultaneous operating rooms can be efficient and does not appear to increase operative duration or negatively impact on patient outcomes (Yount, Gillen et al. 2015).

Outcomes associated with overlapping surgery

The available literature on this subject has emerged only in recent years, largely in response to the controversy arising from the Boston Globe report. All of the available literature is focused on surgical centres in the United States. None of the peer reviewed data available at this stage suggests that the practice of overlapping surgery poses harm to patients. However, it is important to note the following key features of the literature:

- All studies considered only overlapping, not concurrent surgery.
- Only the Mayo Clinic study considered a broad base of surgical specialties.
- The definition of a 'critical' portion of surgery was not provided, rather the decision about what constitutes critical activities is at the discretion of the surgeon.
- All authors describe a situation in which there is an articulated hospital policy regarding the practice.

It is also important to note that all available studies only compare crude rates of mortality and morbidity meaning that there is limited information regarding:

- The severity and type of complications that occurred; and,
- Any root-cause analysis performed on complications that arose.

In considering the adequacy of the literature to inform questions around patient safety it is relevant to ask whether or not concerns regarding concurrent surgery can be assuaged by the data. Those who question the practice of overlapping or concurrent surgery do so from feelings that any diversion in the attention of a surgeon from an individual's care can have deleterious consequences for patient safety. Moreover, this concern is likely to be paramount in complex cases or in patient for whom the surgery progresses in an unexpected fashion. Furthermore, planning overlapping surgery and going between them may also be demanding on a surgeon in terms of non-technical skills such as communication. The question then arises what will happen in the event of an unexpected complication, if in another operating room will the primary surgeon return to attend to the situation or will this be delegated to a secondary surgeon? Furthermore, what consequences will this have for patient whose surgery is interrupted? In general, it is understood that operations that are considered high risk or complex would not normally be scheduled to overlap with others. Since the case reported by the Boston Globe was released it appears that MGH has prohibited overlapping surgery for complex spinal cases.

Even more intractable is the difficulty of determining whether or not a complication which does occur is attributable to the practice of overlapping surgery. Certainly, there have been no cases to date in which an adverse event has been directly attributed to a surgeon performing overlapping surgery.

It is clear that many institutions and surgeons find the practice to be safe, acceptable and efficient. And in the quote below it is evident that there is an implied improvement for patients in that both access is improved and that outcomes might be improved owing to increased volumes. The authors from the Mayo clinic state that:

“these results suggest that patients informed of an overlapping procedure need not interpret this component of the consent process as a safety trade-off for timely access to a needed

procedure. In our high-volume surgical practice we conclude based on the presented evidence that salaried surgeons may continue to apply their surgical judgement when scheduling elective, overlapping procedures with the expectation of equivalent or superior outcomes for patients...In this setting overlapping procedures may improve patient access to needed surgical care, improve operational efficiencies for the institution, and facilitate both institutional and surgeon volumes, thereby improving patient outcomes as volumes are positively associated with improved outcomes for complex surgical care” (Hyder, Hanson et al. 2016).

The practice of overlapping surgery might increase the volume of a centre, allow surgeons to schedule more procedures during the day rather than overnight (when complications are more likely) and facilitate timely access to surgical care. However, the benefits of overlapping surgery from the perspective of the institution, surgeon and patient are yet to be explored in the literature. This is an important issue as without tangible evidence of benefit it is not clear what the incentive for overlapping surgery is or whether it has arisen simply in response to high demand for surgical services or financial incentives to increase surgeon throughput. In practice, despite claims by the Boston Globe, those patients who are scheduled for overlapping surgery are likely to be overall at a lower risk for surgery and whose cases are not anticipated to be complex.

Informed consent and overlapping surgery

The issue of overlapping surgery has in part been so controversial because it appears that (at least in some circumstances) patients were not aware that their surgeon was undertaking overlapping procedures. At first glance this would seem inappropriate; however, on further examination of the issue it has become clear that this is a hotly debated area and that the hospital in question did not have a policy formally requiring the surgeon to disclose this. In preparing this report it was clear that some surgeons do not feel that informed consent necessitates this level of disclosure.

Historically physicians have been trusted to make decisions about their patients care with the understanding that they possessed the greater knowledge and understanding of their patient’s ailment. However, today there is a different social contract that exists between physicians and their patients. Commonly the physician offers guidance and information but the patient retains ownership of, and autonomy in, making the decision about what treatment they will receive. In surgery, much of this process needs to occur before the intervention because patients will not be able to engage with their surgeon while preparing for or during surgery.

According to Fowler, Levin and Sepucha (2016):

“For patients to have a meaningful say in their medical decisions, three essential conditions must be met. First, they have to be informed. Specifically, they have to be given an objective, unbiased presentation of reasonable options to consider and the pros and cons of those options. Second, once informed, patients have to spend some time to consider their goals and concerns and how each option is likely to play out with respect to those goals and concerns. Third, they have to have an interaction with their providers in which their goals and concerns are shared and incorporated into the decision-making process.” (Fowler, Levin et al. 2011)

However, informed consent is complicated and as the authors of one study note:

“Little training exists on the practice of effective informed decision making. What guidance exists is often based on legalistic notions of consent. For instance, the well-known mnemonic PAR reminds the clinician to disclose the nature of the procedure, alternatives, and risks in any informed consent discussion. The rationale of this approach either satisfies an administrative requirement or protects oneself from liability, rather than viewing the decision-making process as a meaningful path toward fostering patient involvement.”
(Fowler, Levin et al. 2011)

The authors of this study analysed the taped conversations of 1057 encounters and found very low rates of what they would consider to be complete informed consent. This finding is in line with other literature on the subject.

In considering this issue in relation to concurrent surgery Mr James Rickert (2016) recently published an opinion piece in *Health Affairs* in which he states that surgeons should tell patients if they practice overlapping surgery, and explain what this will mean in the operating room. Furthermore, he also points out that until now there has been little thought given to when this information should be shared with patients, on this issue he states:

“Telling patients on the day of their surgery—which is often when consent is obtained—that their surgeon will be absent from the operating room and busy working on different patients for parts of their procedure is terribly unfair. At that point, patients are emotionally prepared to proceed with surgery, work arrangements have been made, and family members are all assembled. This is not the time to present potentially disconcerting new information and ask patients to accept it.” (Rickert 2016)

Mr Rickart suggests that given that elective surgery schedules are typically developed weeks or months in advance of a surgery date that surgeons should discuss overlapping surgery when the decision is made to schedule the surgery; this provides patients the time to digest the information, ask questions, and, if preferred seek an alternative. This sentiment is echoed by Dr Healy in another opinion piece published in the *The Journal of Bone and Joint Surgery* (2016). A Senate Finance Committee Staff Report on concurrent surgery found that very few hospitals have policies in place that mandate full disclosure *and* provide guidance around the timing of that disclosure (The Senate Finance Committee 2016).

In examining the comments attached to the opinion piece from Mr Rickart it is clear that some surgeons feel differently – that consent about scheduled overlap is not necessary. This is illustrated in the quotes below:

“If that’s what you want for your patients go ahead and inform them. Hey you could even give them a 4 yr medical education and someone could still say that’s not enough. You could introduce them to every member of the team and discuss their world views. For the rest of us there is work to be done and when I choose the cortical vs. the locking screw it doesn’t matter to the patient. If I say no that is a “critical” part of the case does it need disclosure? Just like your investment portfolio the professional investment agent is rule bound to send you the prospectus and annual report...which you never read or ask a single question about is

that protection? So, the issue of concurrent is for professionals to discuss and the individual patient need not be bothered. Don't invent feel good rules for a perception problem."

Similarly another commenter writes

"I agree that informed consent rarely rises to the ideal of this article. I am not, however, confident that this is the serious (moral?) failure that the author posits...At my last academic medical center, the patient knew if residents would be involved in their surgery, but given the nature of rotations, the 80 hour rule and other practical issues, the specific resident was not identified. I am not convinced that this is essential knowledge for true informed consent."

This is an issue on which consensus and guidance is sorely needed as it pertains to a larger ethical and legal debate around informed consent. In the case of Massachusetts General Hospital the surgeon who undertook Tony Meng's case is being sued for medical malpractice incident involving two simultaneous spinal operations and since the incident, the hospital no longer allows double-booked surgery involving complex spinal cases (The Boston Globe Spotlight Team 2016). However, without guidance on this issue patients cannot be clear on what level of disclosure they can or should expect and surgeons are unclear on what is expected of them and the potential legal risks of disclosure (or not).

Positions and guidance on overlapping surgery

In recent times the focus on this issue has resulted in institutions developing internal policies on the practice which outline the circumstances under which overlapping surgery can be performed and which outline the appropriate measures for ensuring adequate expertise is on hand in the event that the primary surgeon cannot leave one of the operations. Some institutions also have policies regarding how patient consent should be approached. At this stage it appears that each institution is establishing its own norms and level of comfort with the practice with some institutions actively prohibiting overlapping surgery and others encouraging it.

On 6 December 2016 the US Senate Finance Committee, which has jurisdiction over the Medicare and Medicaid programs, as part of its oversight of these programs launched an inquiry to understand the practice and frequency of overlapping surgery. The committee queried over 20 teaching hospitals about their practices and the committee developed a detailed report. Some key points from this report and the ACS Standards on Principles are reproduced below.

Critical portions of the procedure

- ACS guidance states that the critical portions are those *"in which the essential technical expertise and surgical judgement of the surgeon is required to achieve an optimal patient outcome."*
- The US Senate Finance Committee report notes that some patient advocates have identified other criteria that should be used to define the critical components and that some believe that any work on the target organ should be designated as critical whilst still others believe that anything under the innermost layer of the skin is 'critical'.

- The report also notes some hospital policies require surgeons to discuss the critical portions of the surgery with surgical staff and write a list of those portions on a white board in the operating room.
- The US Senate Finance Committee report recommends that institutions: ***“formally identify the critical portions of particular procedures, to the extent practicable, as well as those portions unsuitable for overlap.”***

Defining “immediately available”

- ACS guidance states “The primary attending surgeon is personally responsible for the patient’s welfare throughout the operation. In general, the patient’s primary attending surgeon should be in the operating suite or should be immediately available for the entire surgical procedure. There are instances consistent with good patient care that are valid exceptions. However, when the primary attending surgeon is not present or immediately available, another attending surgeon should be assigned to be “immediately available.”
- The ACS defines immediately available as “Reachable through a paging system or other electronic means, and able to return immediately to the operating room”
- The US Senate Finance Committee report stated that “Among the 17 hospital policies reviewed, about a third define immediately available as being on-campus, which for large campuses could result in substantial time before the surgeon returns to the operating room. Additionally, one hospital specified that the surgeon must be in the perioperative suite and others specified that the surgeon must be available within 5 or 15 minutes. Three hospitals did not define immediately available in their policies.”
- The US Senate Finance committee report states that institutions should ***“prospectively identify the backup surgeon when overlapping surgeries are scheduled.”***

Approaching patient consent

- The ACS Statements on Principles with respect to overlapping surgery states simply that “The patient needs to be informed in either of these circumstances.”
- The US Senate Finance Committee identified variability in whether institutions required surgeons to disclose whether a surgery was overlapping or not and in their review of 14 hospitals consent forms they identified only three in which patients provided explicit written consent to a scheduled overlapping procedure. The following is an example of the wording from one particularly explicit form:

“My surgeon has informed me that my surgery is scheduled to overlap with another procedure she/he is scheduled to perform. I understand that this means my surgeon will be present in the operating room during the critical parts of my surgery but may not be present for my entire surgery. My surgeon has also informed me that she/he will supervise a surgical team which may include another attending surgeon, a surgery fellow and surgery residents and that some members of the surgical team will perform parts of my surgery. I understand that my surgeon or another qualified surgeon will be immediately available should the need arise during my surgery. My surgeon has answered all my questions about overlapping surgery and I give my consent”

- The US Senate Finance Committee recommends that Institutions: ***“Develop processes to ensure that patient consent discussions result in a complete understanding by the patient that her/his surgery will overlap with another patient’s; develop materials such as frequently asked questions; and educate their patients ahead of their surgeries, giving them enough time to review materials and fully consider their options”***

Outcomes and monitoring

- The ACS does not provide guidance on this issue.
- The US Senate Finance committee states that institutions should ***“Develop mechanisms to enforce the established concurrent and overlapping surgical policies and monitor and enforce their outcomes.”***

Overall guidance

An opinion piece by Dr Healy published in The Journal of Bone and Joint surgery provides the following five steps when considering overlapping surgery. These are reproduced below:

1. Obtain specific informed consent at least 2 weeks prior to the operation. This consent should include a specific description of what the attending surgeon will and will not do.
2. Define and implement throughout the organization consistent definitions for overlapping, concurrent and staggered surgery.⁴
3. Define the critical portion of each operation performed in the organization and explain this concept to patients who schedule these operations.
4. Record the specific presence and absence of the attending surgeon in the operating room record.
5. Monitor and evaluate patient outcomes associated with concurrent, overlapping, and staggered surgery.

⁴ concurrent surgery – two operations being performed at the same time in two operating rooms with critical portions of the operation being performed concurrently
 overlapping surgery – two operations being performed at the same time in two operating rooms with critical portions of the operation not being performed concurrently
 staggered surgery – two operations scheduled in two operating rooms back to back in which the attending surgeon completes one operation and moves to the second operating room for the second operation; the operations and the critical portions of the operations are not being performed concurrently.

Conclusions

Overall there is a paucity of information available about the extent of this practice in Australia and all of the published literature has originated in the United States. Furthermore, the Australian healthcare system and its funding mechanisms as well as the relationships between patients and providers are very different from those in the US. The available guidance and reports on the issue are clear that institutions adopting overlapping surgery need to do so within an explicit framework with guidance for surgeons on the definitions of overlapping surgery as well as how to approach consent. However, this guidance largely delegates the decisions about what constitutes acceptable informed consent and appropriate practice to the institution – leaving room for significant variation between institutions. Most patients in the Australian and New Zealand Healthcare system receive excellent surgical care; however, depending on its actual prevalence in Australia and New Zealand there is a need for professional bodies and institutions to provide formalised statements on overlapping surgery. By having explicit guidance about what is considered safe and acceptable patients can have continued faith and trust in medical institutions and surgeons can feel assured that they are practicing in line with the accepted standards of their profession.

Resources

Online resources

Massachusetts General Hospital (2016), Information on patients regarding concurrent/overlapping surgery, <http://www.massgeneral.org/overlapping-surgery/>

The Boston Globe Spotlight Team 2016, Clash in the Name of Care.
(<https://apps.bostonglobe.com/spotlight/clash-in-the-name-of-care/>)

Erin Shelley (THE WEEKLY STANDARD, 2016), The Problem with Informed Consent– What you don't know can hurt you. (<http://www.weeklystandard.com/the-problem-with-informed-consent/article/2000389>)

Jenn Abelson, Jonathan Saltzman and Liz Kowalczyk (The Boston Globe, 2016), Concurrent surgeries come under new scrutiny. <https://www.bostonglobe.com/metro/2015/12/19/concern-over-double-booked-surgeries-emerges-national-issue-for-hospitals/6ljRw2WkDYdt5oZljpaicO/story.html>

David W. Johnson (4sighthealth, 2016), Misdirected Fury: The Boston Globe “Spotlights” Concurrent Surgeries. <http://www.4sighthealth.com/misdirected-fury-the-boston-globe-spotlights-concurrent-surgeries/>

Alexander Langerman (The Boston Globe, 2016), Careful, compassionate, concurrent surgery. <https://www.bostonglobe.com/ideas/2016/01/10/careful-compassionate-concurrent-surgery/YBNewe5HE6ygL05N27UixJ/story.html>

Peer-reviewed literature

Zhang, AL, Sing, DC, Dang, DY, Ma, CB, Black, D, Vail, TP & Feeley, BT 2016, 'Overlapping Surgery in the Ambulatory Orthopaedic Setting', J Bone Joint Surg Am, vol.98(22), pp. 1859-67.

Hyder, JA, Hanson, KT, Storlie, CB, Glasgow, A, Madde, NR, Brown, MJ, Kor, DJ, Cima, RR & Habermann, EB 2016, 'Safety of Overlapping Surgery at a High-volume Referral Center', Ann Surg, Epub ahead of print.

Healy, WL 2016, 'Overlapping Surgery: Do the Right Thing: Commentary on an article by Alan L. Zhang, MD, et al.: "Overlapping Surgery in the Ambulatory Orthopaedic Setting"', J Bone Joint Surg Am, vol.98(22), pp. e101.

Langerman, A 2016, 'Concurrent Surgery and Informed Consent', JAMA surgery;151(7):601-602.

Reports

The American College of Surgeons 2016, Statements on Principles, viewed 16 December 2016, <<https://www.facs.org/about-acs/statements/stonprin#ia>>.

The Senate Finance Committee 2016, CONCURRENT AND OVERLAPPING SURGERIES: ADDITIONAL MEASURES WARRANTED. Unknown, The Senate Finance Committee: 1-20.

Appendix A – Royal Australasian College Of Surgeons Position paper (2013)

POSITION PAPER

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS

Subject:	Surgeons performing synchronous procedures in two theatres	Ref. No.	FES-PST-039
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BACKGROUND

The College has received concerns about the safety of practice of a consultant surgeon performing procedures in two operating theatres at the same time, and has been asked to form an opinion about the appropriateness of this behaviour.

This practice has occurred in both private and public hospitals. Sometimes surgeons perform the entire procedure, and then move directly from one theatre to another anaesthetised patient. Sometimes they delegate the commencement or completion of an operation to a junior colleague or trainee.

The perceived advantages for the surgeon include minimising downtime between cases, and allowing a larger number of procedures to be performed within a given time period. The hospital can also benefit by an increased number of procedures, although less than could be performed by two surgeons each using one theatre.

POTENTIAL ISSUES

Operating in two theatres is undoubtedly more stressful for the surgeon. Attention needs to be focused on the clinical needs of two patients at once. This can sap the surgeon's mental capacity and thereby impair decision-making. The effect may not be marked if the procedures remain routine and run to schedule. However unexpected difficulties and complications can occur. The additional time pressures can compound the mental stress.

If parts of the operation are delegated to a junior assistant there is the necessity for appropriate handover of responsibility. There may be a need to return to a patient to deal with an unexpected problem, leaving a second patient whose operation has already commenced. There is a risk that near enough will be accepted as good enough, and a reduced likelihood of slowing down when appropriate to think through problems and correct any mistakes.

The patient may not be informed that parts of their operation may be performed unsupervised by a more junior doctor. They may not have given appropriate informed consent, or been offered an alternative if they wish.

Surgeons should participate in all phases of the Surgical Safety Checklist. This includes the time out at commencement and sign out at the end of a procedure. This cannot occur unless the surgeon is physically present. There is an increased risk of a site/ side error, and an increased risk that key patient information may be overlooked.

Surgeons work as part of operating teams. Good communication and leadership maximise team performance. It is difficult to optimally contribute to two teams at the same time.

It is likely that the average anaesthetic time will be longer. Anaesthetists report delays with an anaesthetised patient whilst the surgeon is unexpectedly delayed in the adjacent theatre. The process is not efficient for the anaesthetist. Their down time is increased resulting in fewer cases in a given time. The same is true for the operating theatre as a whole.

CONCLUSION

Overall the practice has little to commend it. The potential downsides are considerable. RACS advises any surgeon contemplating this practice to ask themselves the following questions: -

Is this the safest way to practice?

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Appendix B – Methods

The authors undertook searches in Medline and Embase using the terms:

Concurrent OR simultaneous OR overlapping AND surg*

Very few relevant results were retrieved.

The authors also undertook searches in google to identify reports, news items and opinion pieces.

The terms used were: concurrent surgery, overlapping surgery and simultaneous surgery.

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