Commentary on:
Comparison of Patient Outcomes and Cost of Overlapping versus Nonoverlapping Spine Surgery
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Overlapping Surgical Procedures

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Zygourakis et al.[1] provide a retrospective snapshot of a spine surgical practice at a premier neurosurgical institution with the intent to analyze whether intraoperative time overlap of some surgical procedures portended a different outcome compared with when the procedure occurred in an immaculate time zone without any overlap. Of the 2319 procedures performed by 3 attending surgeons over a 3-year span, 848 (37%) had some overlap. The detailed statistical analysis suggested no deleterious effect of an overlapping procedure in terms of intraoperative blood loss, return to the operating room (OR), length of hospital stay, and total hospital cost. The 30-day mortality and readmission rate were also unaffected. Zygourakis et al.[1] did note that overlapping surgeries tended to be more urgent and had longer procedure times and lower rates of discharge to home.

This study is a sequel to a recently published report on overlapping cranial vascular procedures from the same institution.[2] That study had similar results despite a different cohort of patients; concurrent or overlapping surgeries made up almost 68% of the cases, were more likely to be routine or elective, and had a lower severity of illness or risk of death. Concurrent cases had longer procedural times and more unplanned 30-day readmissions, but fewer unplanned returns to the OR, a shorter length of hospital stay, higher rate of discharge to home, and lower 30-day mortality. Surgical blood loss, intraoperative aneurysm rupture, postoperative residual aneurysm, acute respiratory failure, sepsis, and postoperative stroke were similar between concurrent and nonconcurrent cases. After adjusting for patient demographics, procedure type, and clinical indicators, patient outcomes were equivalent in both groups.[2]

These studies are an excellent thesis on a phenomenon that received scant attention previously.[1-3] The principal message is that there are no significant untoward effects from the practice of overlapping surgery for cranial vascular and spine procedures at this particular institution. These results may not be generalizable to all academic or private institutions; they simply reflect the experience of a group of surgeons with an excellent support structure and substantial resources. And so, one may ask, is this enough evidence to support the practice of overlapping or concurrent surgeries? Concern about the practice of concurrent surgery resulting in an untoward outcome from a surgical procedure at another prestigious institution prompted the Senate finance committee and other national surgical organizations to scrutinize the process, and the debate continues.[4,5] Is that recent controversy just a minor blemish on an otherwise excellent system, or will it alter our practices in a substantial way?

Let's make some distinctions. We can set concurrent surgeries aside. The American College of Surgeons (ACS), and American Association of Neurological Surgeons (AANS), and major neurosurgical national societies (Congress of Neurological Surgeons, Society of Neurological Surgeons, and American Board of Neurological Surgery) with jurisdiction over most practicing surgeons in the United States, have taken the lead in framing the issue and providing clarity to their members.[6,7] They categorically proscribe against the practice of concurrent surgery, defined as

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- Spine surgery

Abbreviations and Acronyms
AANS: American Association of Neurological Surgeons
ACGME: American Council for Graduate Medical Education
ACS: American College of Surgeons
OR: Operating room

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"when the critical or key components of the procedures for which the primary attending surgeon is responsible are occurring all or in part at the same time." Most medical centers also have rules that counsel against concurrent surgery. Governing bodies such as Centers for Medicare and Medicaid Services, and accreditation agencies such as The Joint Commission, require hospitals to adhere to nationally prescribed standards.[5-7]

So it is overlapping surgeries that we are talking about and they seem to be a significant tranche of the surgical practice at large academic centers.[2] The ACS and AANS recognize that and note that this is acceptable under certain select circumstances:

> In instances when the "critical or key" elements of one operation have been finished and "there is no reasonable expectation" that the primary attending surgeon will need to return to the operation, a surgeon can delegate less critical or non-critical parts of the operation to another surgeon or qualified practitioner while he or she begins an operation in another room. When the critical components of the first operation have been completed and the surgeon is performing critical components of an operation in another room, the surgeon must assign responsibility of the first operating room to another attending surgeon.

Overlapping surgeries are considered suitable if they do not negatively affect the seamless and timely flow of either operation. There are caveats: the surgeon must ensure that the patient is safe and informed. The surgeon must precisely define what constitutes critical parts of the operation, to ensure that appropriate personnel are available, to be physically present when required or immediately available via pager or other electronic means, or to have a backup surgeon if required.[5-7]

This phenomenon is largely confined to institutions with residency or fellowship training programs and Zygourakis et al.'s study[1] provides a realistic portrayal of the surgical schedule at such a facility. One can make 2 reasonable inferences: these patients are clinically well served and the educational mission of the institution is maintained. Sure, for a busy surgeon, overlapping surgery may translate into more productivity as measured by relative value units that may affect reimbursement. But a more careful perusal shows dynamics that are not easy to conflate. The quotidian logistics of a busy neurosurgical service are complex; surgical cases may be elective or emergent, at all times of the day or night, and may arrive at a frenetic pace. If a hospital bed is available, care is provided and hours of painstaking work goes into each clinical situation. In this milieu, the contribution of residents and fellows is invaluable; they enhance the care of patients, whether urgent or elective. The careful presurgical workup and the meticulous postsurgical care are largely their domain, not to mention the work they perform on consultations that do not make it into the OR. And they are an integral part of the intraoperative process as well. With complex or lengthy cases, attending physicians cannot physically perform every aspect of the procedure and have to entrust some of this to other individuals at some point; the opening and closing of a craniotomy or complex spine case are staple and excellent teaching tools for residents and allow the supervising surgeon to focus on the critical aspects of the case. As trainees mature up the ladder of residency and show increasing proficiency, they are entrusted with more critical parts of the surgical procedure. This participation reinforces the commitment that residents have and they appreciate being a part of the surgical team in the OR. Remember, this is the most prized aspect of residency and fellowship training and what prospective candidates seek out the most when they evaluate a training program: the ability to gain confidence and knowledge through some degree of independent surgical practice. It does create a competent new surgeon who can then safely practice after graduation from the training program.

To the laity, the goal of resident education may seem irrelevant or even contradictory. But in reality, this is a critical element of the charter of an academic institution and the responsibility of a teaching physician, especially on the surgical side. Resident education is regulated by the American Council for Graduate Medical Education (ACGME). ACGME devoted considerable intellectual energy with input from multiple disciplines to formulate a document that allows an objective biannual assessment of a resident's progress through a set of comprehensive developmental milestones enshrined into residency training.[8] There is great detail and granularity that evaluates every aspect of the residents' progress: "The Milestones describe the learning trajectory within a sub-competency that takes the resident or fellow from a beginner in the specialty or subspecialty, to a highly proficient resident or fellow or early practitioner."[8] It is a well-thought-through strategy to serve the public interest in the best possible way. ACGME appreciates the importance of this classic paradigm of apprenticeship and graded responsibility that has flourished worldwide for centuries and that has produced some of the best craftsmen and surgeons. ACGME mandates that we certify which procedures residents are capable of performing under supervision and those they can perform independently.[8] One can reasonably assume that ACGME recognizes that to produce the best physicians and surgeons, they have to mature into independent practitioners under the umbrella of their training programs. This is their core mission: to accredit programs that provide the best physicians to care for the public at large. It is the safest way to ensure that licensed and board-certified physicians have the necessary skills to fill the shoes of their mentors.

Surgeons who schedule overlapping cases have busy work schedules. There is good reason they are in such high demand: they are simply the best at what they do and have the ability to positively affect many lives. They tackle complex cases well beyond the scope of a community hospital, and their clinic and surgical schedule is so busy that patients wait months to see them. They are also among the best educators and have taught scores of accomplished residents and fellows who have gone on to illustrious careers in both academics and private practice. And they have exactingly high standards. They do not assign these duties lightly; the residents and fellows must show the requisite knowledge and expertise to be entrusted with the tasks. This is perhaps the critical element: the judgment of the supervising physician is paramount in determining who is entrusted with which aspect of a patient's care. This careful appropriation of responsibility occurs on a daily and hourly basis in every medical setting, whether surgical or nonsurgical, and is the bedrock of the