The Error of Omission: A Simple Checklist Approach for Improving Operating Room Safety

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Summary: The primary goal of patient safety must go hand in hand with the goal of producing reliably good aesthetic and functional results. The implementation of a proactive checklist improves operating room communication and takes the necessary step toward reducing the often neglected errors of omission. These steps are necessary if we are to ultimately achieve our goal of improving safety comprehensively in the operating room. (*Plast. Reconstr. Surg.* 123: 399, 2009.)

As plastic surgeons, we have rightfully been consumed by the desire to produce reliably good aesthetic and functional results. However, producing these results *safely* can be taken for granted. The same dedication to achieving reliably good results has been impressively lacking in the area of patient safety. Much has been written about the causes of errors in our operating rooms, such as the need for a more open communication between surgeons and the operating room personnel, the need to confirm the surgery to be performed (the "surgical pause"), or the deliberate marking of the side to be operated on. Clearly, these communication efforts are essential if we are to reduce the error rate in the operating room. However, an important distinction must be made in the qualitative nature of these types of errors. The resultant mishaps such as wrong-side surgery and wrong-patient surgery may be properly called errors of *commission*. What is still lacking in our quest for improvement is the consideration of errors of *omission*. We have all experienced the distressing moment when we learned that the preoperative antibiotics had not been given or the antiembolism pumps had not been applied. These two examples represent true errors of omission. Usually, the staff shrugs the incident off and you can only hope all goes well despite the misstep. If the event had been an error of commission, such as giving the wrong antibiotic or putting the pumps on upside down, an incident report would be filed and appropriate action taken in an effort to prevent a recurrence. However, with the above-described errors of omission, there is usually no documentation or review made, even though the patient has been exposed to an increased risk for complications.

How then do we also reduce or eliminate these errors of omission? The purpose of this report is to describe what one in-office surgery center has done to reduce the incidence of these errors of omission and realize a more balanced surgical safety effort (Fig. 1).

CONCEPT

The seminal event that sparked the creation of an operative checklist concept was the senior author's (L.K.R.) observation of a friend and private pilot checking and cross-checking his private plane before takeoff. Pilots, of course, have, for many years, been using detailed preflight checklists. It seemed intuitive that this type of checklist system could be implemented in the operating room.

Thus, over a period of a few years, a checklist, a list of prerequisite items to be confirmed by the members of the surgical team before the start of the operation, was designed and honed by the senior author. Initially, only a preoperative checklist, akin to the aforementioned preflight protocol, was established. However, before long, it became evident that the checklist must include both the intraoperative and postoperative periods to fully protect the patient. The intention of this article is to disseminate this checklist concept, which could then be personalized and easily implemented into each physician's own operating room protocol.

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Patient Name_____Date _____
Procedure
_____

BEFORE the Operating Room:

1. Procedure(s) confirmed with patient as written on consent _____
2. N.P.O. status confirmed_____
3. Allergies noted:
_____
4. Current routine medications noted:
_____
5. Patient has taken routine high blood pressure med _____
6. Significant Medical History noted:
_____
7. Vitals taken: Pre-op BP____Pulse_____Weight_____lbs. Height _____
8. Anesthesia problems in the past noted: _____
_____
9. Oral meds given:

Arnica____ Bromelain ____ Valium____ Pepcid____ Reglan ____
Antibiotic (for Local cases) ____ Clonidine ____ Acyclovir (for CO2 laser cases) _____

10. Emend p.o. given (General Anesthesia cases) _____
11. Patient voided and removed all jewelry _____

BEFORE the Surgery:

12. Monitors placed: EKG___ BP___ O2 SAT ___ Grounding Pad w/proper settings _____
13. Antibiotic immediately given following placement of I.V. _____
14. O2 nasal catheter placed with all connections secured _____
15. Circulation boots placed and functioning ____ Bair hugger applied _____
16. Anesthetic eye drops placed (Bleph cases) ___ Foley Cath placed (Abdominal cases) _____
17. Consent form and pre-op photos displayed _____
18. Surgical pause conducted _____
19. Surgeon reminders given (Bleph : hx of dry eye) (Facelift/Abd: hx of smoking) _____
20. Note posted on breast implant boxes as reminder to inject Marcaine _____

DURING the Surgery:

21. Patient's position on bed checked w/ every bed position change (arms and legs) _____
22. Prophylactic IV meds administered: Zofran 4mg IV ___ Decadron 10mg IV __
23. Marcaine injected w/ breast and abdominal cases _____
24. Consent checked to confirm all procedures performed _____

AFTER the Surgery:

25. Earplugs and/or eye shields removed _____
26. Ice placed to operative sites _____
27. T.E.D. hose applied _____
28. Dose of Diflucan given (for CO2 laser cases) _____
29. Discharge instructions given to patient and family _____
30. Patient supplies bag given (including ***medications from the refrigerator)*** _____
31. Recovery called and report given to RN _____
32. Dr. Rosenfield has visited patient before discharged _____
33. Narcotics drawer locked and key hidden _____
34. Discharge door re-locked _____
35. Monitoring equipment and oxygen turned off _____

Fig. 1. Operating room checklist.

DISCUSSION

The concept of improving patient safety seems obvious and redundant in today's world of "right" side presurgical protocols, surgical pauses, and clinical pathways. It is estimated that up to 98,000 Americans die each year as a result of preventable medical errors.[1] Implicit in the safe operation is a reduction in errors that could lead to mishaps and patient injury. To this end, there should be an exhaustive, multistep system to ensure safe oper-

ations. This system must not only include the obvious intraoperative needs but should also encompass the often-neglected preoperative and postoperative periods.

Until recently, the concept of safety has been measured in terms of operative mortality and postoperative complications. These self-reported results have shown plastic surgery procedures to be by and large safe in terms of death and major complications.[2–4] Despite the seemingly safe nature of plastic surgery procedures, several highly publicized deaths after outpatient plastic surgery procedures have recently brought attention to the question of safety. In 2002, the American Society of Plastic Surgeons task force on patient safety in office-based surgery facilities reported guidelines for ensuring safe surgery. These guidelines were meant to function as practice advisories and included recommendations on selecting patients, preventing thrombus, and setting standards for surgery facilities.[5,6] These articles have focused on defining complication rates or making general recommendations to improve safety. Much has also been written about the causes of errors in our operating rooms, such as the need for more open communication between surgeons and the operating room personnel,[7,8] the need to confirm the surgery to be performed (the surgical time-out), and the deliberate marking of the side to be operated on. These efforts are certainly critical if we are to reduce the error rate in the operating room. However, we must go further.

There is surprisingly little literature on how to improve safety. The published articles mostly discuss data collection and reporting of adverse events. These articles generally state that office-based procedures are safe, with finite complication rates and mortality rates. However, these studies generally focus on and publish data about errors of commission. These statistics are clearly of great value but usually preoccupy the surgeons and hospitals at the expense of the often neglected errors of omission. In fact, this article is the first to focus on these errors of omission. One of the major flaws marring these prior efforts at improving safety was the lack of practical, discrete, and enumerated suggestions that a surgeon could implement the next morning in his operating room to improve safety. The checklist outlined here goes beyond simply recommending that the surgery facility be American Association for Accreditation of Ambulatory Surgery Facilities certified, or that the surgeon have proper credentials and all nurses be Advanced Cardiac Life Support certified. These measures are important from a policy standpoint and are essential to run a truly credible and safe practice. However, from case to case, how do we reduce errors? The checklist goes one step beyond recommendations and takes a real-time proactive role to ensure safe procedures.

It is surprising that surgeons have not adopted checklists in the operating room. In contradistinction, the highly skill-based, multitasking, team-dependent aviation industry has been perfecting the checklist concept for over 75 years. The aviation industry is indeed often cited as a model for safety. The industry has been using the crew resource management model, which encourages the people within a team to interact more efficiently. To this end, flight crews use standard operating procedures and checklists to ensure a safe flight. Recently, the American College of Surgeons has published a document on the application of the aviation model in the operating room.[9] Airplanes are more complicated and flight crews are larger. Individuals must accomplish their own tasks and interact with other members of the team. Based on psychology research that has analyzed the behavior of flight crews, crew resource management was devised to improve interactions between team members by leveling the hierarchy and encouraging junior members to voice their concerns. Senior members were taught to listen. Although the captain maintains final authority, other crewmembers now interact through the use of preflight briefings, standard operating procedures, and checklists. All of these actions are meant to increase communication, accomplish all mandatory actions, and prevent the omission of other tasks.

This article underscores this latter demand, to reduce errors of omission through the use of a checklist. A checklist is a simple concept: rather than depending on the memory of those involved, it ensures that all the desired actions are accomplished. Clearly, the same concept of a checklist can be applied to our operating room setting. A recent study by Lingard et al. showed that the implementation of a preoperative checklist to general surgery procedures reduced communications failures by 67 percent.[10]

This tool is particularly valuable when an operating room does not have the luxury of consistent staff but still must function safely despite replacement staff at shift change, or "floating" staff. We are all aware of the potential breakdown in protocol when staffing is altered. The safety net capability of the checklist has been substantiated even when working with the same team day after day and, even more impressively, when it is necessary to use outside staff unfamiliar with our pro-

tocol. Indeed, over these same years, the checklist has become the only truly consistent, unfailing "member" of the team ready to navigate the operating room safely. It has been the observation of the senior author and his surgical staff that since the introduction of the checklist and its use over the past 5 years in over 2000 cases, errors of omission have become unusually rare events. Since these errors are in fact rare and usually nondocumented events, a retrospective study could be impractical because it would require the examination of an inordinate number of cases to be statistically significant. Also, to conduct a prospective study would potentially put patients at risk for adverse events and as such would not be feasible or indeed ethical.

CONCLUSIONS

Common sense, good judgment, and experience are not enough to prevent errors of omission in the operating room. Human memory is fallible. The surgeon's focus must extend beyond his or her own operative demands to include those of the team, the anesthesiologist and the nurses. If that is not enough incentive, in the eyes of the law, the surgeon may still be considered the "captain of the ship" and as such be responsible not only for his or her own operative actions but also those of the entire surgical team. Therefore, we must adopt clear methodology to prevent these errors in the operating room.

Many articles have been published, both inside and outside the plastic surgery literature, that address safety in the operating room. These same articles have shown that outpatient plastic surgery is indeed quite safe. However, in all cases, the content of these articles has usually been a litany of statistics, with very general recommendations and without concrete protocols, guidelines, or checklists.

Rather than defend office-based surgery based on low risk numbers, why not implement simple measures intended to reduce the risk even further? Unfortunately, because the current true risk remains and will probably always be unknown, there will be no reliable method with which to study the effects of a checklist and truly prove its true impact. Just as the aviation industry could not conduct randomized controlled trials to validate the safety of their changes, we cannot either. A proactive checklist takes memory out of the equation. Even though the risk attributable to errors of omission is generally low, tolerance of these same errors should be low as well if we are to continue to increase our safety in the operating room.

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