Impact of a Wireless System Upon Verbal Communication in a Simulated Robotic Operating Theater

Alexander Thomas, Zahabiya Campwala, Mohamed Keheila, David Ruckle, Matthew Pierce, Braden Mattison, Benjamin West, Jerry Thomas, Patrick Hogue, Samuel Abourbih, and D. Duane Baldwin

OBJECTIVE To compare the efficacy of communication via the standard Da Vinci Si speaker system with a wireless, hands-free audio system in a prospective blinded study.

METHODS Nine hundred and sixty surgical phrases were spoken in a simulated robotic operating room (OR), including 480 phrases expressed via the Da Vinci Si speakers and 480 phrases expressed through a wireless, hands-free system. Using a dual console robotic system, communication was evaluated. Wireless headsets were given to the console and assistant robotic console surgeons, bedside assistant, anesthesiologist, and circulating nurse. An accurate response was defined as hearing the phrase correctly and transcribing it on a data sheet. The primary outcome was the number of correct phrases recorded during the study and secondary outcomes included subjective clarity and effectiveness of communication reported using a Likert scale.

RESULTS Overall, the wireless, hands-free system increased the accuracy of communication (390/480 [81.3%]) compared to the conventional robotic system (310/480 [64.4%]; $P < .001$). The bedside assistant, anesthesiologist, and circulating nurse had significantly fewer correct phrases recorded than the assistant robotic console surgeon when using the robotic speakers ($P < .05$ for all). In contrast, there were no significant differences in the number of correct phrases recorded between different positions when using the wireless system. Subjectively, the wireless system resulted in improved clarity and effectiveness of communication ($P = .021$; $P < .001$, respectively).

CONCLUSION Robotic operating systems have intrinsic barriers to effective communication between the surgeon and the rest of the operating room team. Improved communication could reduce surgical errors and improve patient safety. UROLOGY 123: 151−156, 2019.

Robotic surgery has become increasingly popular but may be limited by communication difficulties between the surgeon and their team. Although robotic surgical approaches have been shown to reduce patient morbidity compared to open surgery and improve the ergonomics and comfort of the surgeon, use of this technology creates unique challenges.[1] The spatial reorganization of the operating room (OR) during a robotic procedure creates verbal communication challenges compared to open and laparoscopic surgery, as the surgeon is removed from the operating field when sitting at the console leading to diminished direct contact between the surgeon and the operating team.[2] Robotic surgical systems also change the work flow and zones of sterility, and add a level of technological complexity that can further impede OR communication.[3] In addition, the surgeon must rely on the surgical team for situational awareness since the console is separate from the patient and operating field.[3] Poor quality speaker systems may result in disruptive feedback, further impeding communication.[4] Thus, robotic platforms increase the need for highly accurate verbal communication in the OR.

Failure to communicate effectively may lead to longer operating times, technical failures, diminished focus on the operative field, and increased complications.[4] Healey et al suggested that supplemental communication equipment could bypass the noisy OR environment and the acoustic limitations of robotic communication systems.[3] The purpose of this study is to compare the Da Vinci Si external speakers to a wireless, hands-free audio system in a single blinded study assessing communication during robotic surgery. We hypothesize that use of a wireless, hands-free audio system will improve communication among the surgical team compared to the Da Vinci Si external speakers.

Funding Disclosure: *No competing financial interests exist.*

From the Department of Urology, Loma Linda University Health, Loma Linda, CA

Address correspondence to: D. Duane Baldwin, M.D., Department of Urology, Loma Linda University Health, 11234 Anderson Street, Room A560, Loma Linda, CA 92354. E-mail: dbaldwin@llu.edu

Submitted: April 17, 2018, accepted (with revisions): July 12, 2018

https://doi.org/10.1016/j.urology.2018.07.059
0090-4295

METHODS

Surgical phrases were read by a console surgeon seated at a Da Vinci Si robot (Intuitive Surgical Inc., Sunnyvale, CA) within a simulated OR environment. The same primary surgeon was employed in all trials and was blinded to the system in use. A researcher uninvolved with the data analysis switched between communication systems following a block randomization scheme. Four members of the surgical team were asked to transcribe a total of 960 spoken surgical phrases, and they were unable to be blinded in this protocol. The surgical team consisted of subjects placed in the positions of the assistant robotic console surgeon, bedside assistant, anesthesiologist, and circulating nurse. The control communication was provided by the standard Da Vinci Si external speaker system and the experimental comparison was a wireless, hands-free system.

The hands-free system employed in our study is an internet-based system that utilizes the TeamSpeak 3 application (TeamSpeak Systems Inc., Chula Vista, CA). Adapting TeamSpeak 3 for the OR included obtaining a host server for a Virtual Private Network (VPN) and downloading the TeamSpeak 3 server and client software. This study used a free server from LogMeIn Hamachi (LogMeIn Inc., Boston, MA). The TeamSpeak 3 and VPN servers were hosted on a laptop that was connected to the wireless internet available in the OR. Other individual mobile devices were used to download the TeamSpeak 3 application and were connected to the VPN hosted on the laptop. Bluetooth headsets were connected to each device to make the setup wireless and hands-free (Motorola Boom, Motorola Inc., Schaumburg, IL).

A realistic OR environment was generated using background noise recorded during a live procedure combined with music. The background noise provided was a recording taken from an actual operating theater, which replicated the beeping of monitors, pulse oxygenators, ventilators, and other sounds routinely encountered in an operating room. Background noise was adjusted to range from 60 to 70 dB to be representative of the average OR.

All 4 subjects took an audiometry test prior to the study to ensure auditory acuity. Using our institution's robotic operating theater, subjects were positioned at the stations of the assistant robotic console surgeon, bedside assistant, anesthesiologist, and circulating nurse (Fig. 1). Between each trial, subjects rotated to the next position in the simulated OR, yielding 4 total trials at each position. Each trial consisted of a randomized list of 60 surgical phrases drawn from a 90 phrase pool that was recorded during live urologic robotic surgeries. Randomization was accomplished with a number generator. After the participants heard the surgical phrases through either the Da Vinci Si system or the wireless system, they wrote down each phrase on a sheet of paper. The initial system for each trial was randomly selected and was then alternated every 10 phrases in a crossover fashion.

The primary endpoint was the number of phrases that were correctly recorded at each position. Secondary endpoints were the clarity and effectiveness ratings given to each system by the participants after each trial. Clarity was defined as the amount of static, interference, or quality of the transmission from the wireless and Da Vinci Si systems. Effectiveness was defined as whether the subjects thought that the modality was practical at a given position in the OR. Clarity and effectiveness were rated using a visual analog scale from 1 to 10 with 1 as the worst and 10 as the best. Statistical analysis was done using the chi-square test for categorical variables and Mann-Whitney *U* test for ordinal variables.

RESULTS

Nine hundred sixty phrases were spoken to 4 subjects at 4 simulated positions, with 480 of these phrases heard from the Da Vinci Si speakers and 480 heard through the wireless system. Performance between the wireless system and the robotic speakers was significantly different (Table 1). Sixty-four percent of items heard from the robotic speakers were recorded correctly compared to 81.3% of items heard correctly with the wireless

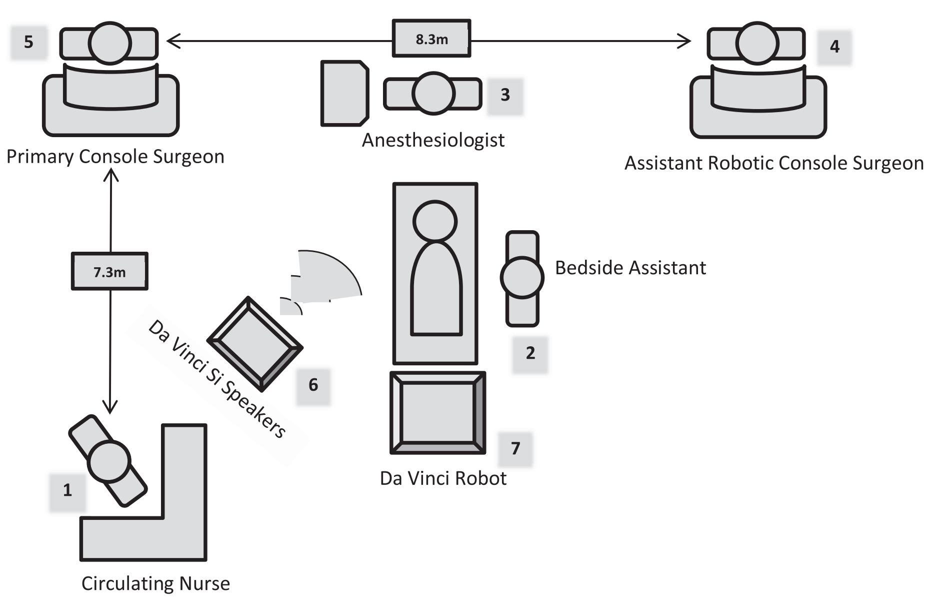

Figure 1. Layout of the simulated robotic operating theater.

Table 1. Comparison of correct phrases recorded using either the robotic speakers (RS) or the wireless system (WS) at each position. Bolded values are statistically significant

Position	Modality	*N* (phrases)	Total Correct (%)	Range	*P* Value
Bedside assistant	Robotic speakers	120	78 (65)	[16, 26]	**0.009**
	Wireless system	120	98 (80)	[22, 26]	
Assistant robotic console surgeon	Robotic speakers	120	92 (77)	[14, 26]	0.43
	Wireless speakers	120	97 (81)	[20, 27]	
Anesthesiologist	Robotic speakers	120	69 (58)	[13, 20]	**< 0.0001**
	Wireless speakers	120	101 (84)	[20, 29]	
Circulating nurse	Robotic speakers	120	71 (59)	[13, 22]	**< 0.001**
	Wireless speakers	120	96 (80)	[21, 27]	

system ($P < 0.001$). When the wireless system was used, there were significantly more correct phrases recorded at the bedside assistant (98 (80%) vs 78 (65%) total correct; $P = 0.009$), anesthesiologist (101 (84%) vs 69 (58%) total correct; $P < 0.001$), and circulating nurse (96 (80%) vs 71 (59%) total correct; $P < 0.001$) positions compared to when the robotic speakers were used. The assistant robotic console surgeon did not display any significant differences between the 2 systems ($P = 0.430$).

A within-system analysis showed that performance varied by position as well. There were no significant differences in performance between the bedside assistant, anesthesiologist, and circulating nurse ($P > 0.05$ for all) for the robotic speaker system. However, subjects scored significantly worse at the bedside assistant ($P = 0.047$), anesthesiologist ($P = .002$), and circulating nurse ($P = .004$) positions compared to the assistant robotic console surgeon position (Table 2). Table 2 shows the number of correct phrases recorded at each position with the robotic system and the wireless, hands-free system. There was no significant difference in the number of correct phrases heard between positions when the wireless system was used (Table 2). Subjects did not improve their phrase recognition as the experiment progressed.

Both the clarity and effectiveness of the wireless system were ranked significantly higher than those of the robotic speakers (Supplementary Fig. 1). The median clarity rating for the wireless system was 7 compared to a median of 4 for the robotic speakers ($P = .021$), while the median effectiveness rating for the wireless system was 7 compared to a median of 4 for the robotic speakers ($P < .001$).

DISCUSSION

Although traditionally considered sterile and silent theaters, modern-day operating rooms utilize equipment and monitors that can contribute significantly to the background noise. Although the average noise level in an OR is 60-70 dB,[5] staff conversations can reach 78 dB and equipment-related noises, such as dropped tools and ringing alarms, can reach up to 120 dB.[6] These levels exceed the ≤ 55 decibel limit set by the World Health Organization required to maintain 100% effective verbal communication.[7] In fact, 92% of medical miscommunications are verbal, the majority of which occur between 2 parties: the transmitter and the receiver.[8] Operating room noise can directly decrease auditory processing and a robotic system with imperfect external speakers that do not filter out background noises can result in dangerous miscommunication.[4,9]

Communication breakdown can decrease OR efficiency. Lingard et al found that when 30% of communication in the OR was not properly understood, there were increases in team tensions, surgical delays, wasted

Table 2. A within group comparison of the robotic and wireless systems. Bolded values are statistically significant

Position 1		Position 2	*P* Value
Robotic system			
Assistant robotic console surgeon (77%)	vs	Bedside assistant (65%)	**0.047**
	vs	Circulating nurse (59%)	**0.0037**
	vs	Anesthesiologist (58%)	**0.0016**
Bedside assistant (65%)	vs	Circulating nurse (59%)	0.35
	vs	Anesthesiologist (58%)	0.23
Circulating nurse (59%)	vs	Anesthesiologist (58%)	0.79
Wireless system			
Assistant robotic console surgeon (81%)	vs	Bedside assistant (80%)	0.87
	vs	Circulating nurse (80%)	0.87
	vs	Anesthesiologist (84%)	0.50
Bedside assistant (80%)	vs	Circulating nurse (80%)	1.00
	vs	Anesthesiologist (84%)	0.40
Circulating nurse (80%)	vs	Anesthesiologist (84%)	0.40

resources, and procedural errors.[10] Christian et al concluded that there were 9 instances of miscommunication per case in the 10 general surgical procedures that were observed.[11] Twenty-one percent of these instances led to delays, and 6% led to either wasted resources or increased patient risk.[11]

Clear communication is fundamental to maintaining patient safety.[12] An analysis of 146 surgical errors showed that miscommunication contributed to 43% of adverse surgical events, such as permanent disability, bleeding, wound infection, and death.[13] Communication breakdown is involved in 14% of surgical injury insurance claims by patients.[8] In addition to endangering the patient, intraoperative miscommunication directly led to 4% of malpractice suits, with attending surgeons being the most commonly involved.[8]

Clear and accurate speech has been identified as a key component of successful communication, and this fidelity of communication may not be completely maintained by the current robotic system.[4,14] Our study quantifies this communication deficit in robotic surgical systems with a comparison to an accessory wireless communications system.

The wireless system utilized in this study demonstrates that a correctable problem with verbal communication exists in robotic-assisted surgery. Increasing the accuracy of communication among the surgical team has 3 potential benefits. First, smoother communication could reduce operating time as delays for equipment replacement or repeat instructions could be minimized.[4,15] Second, enhanced communication could avoid unnecessary resource use, such as opening the wrong type of suture, which would result in reduced operating room cost.[10,11] Finally, patient safety can be improved with clearer communication that helps to reduce procedural complications.[10,11] Improving communication in robotic-assisted surgeries can remove a drawback to a developing technology, improve OR efficiency, and enhance patient safety.

There are many other communication-enhancing devices utilized outside of the medical field that can be adopted to improve communication in the OR. Automatic speech recognition software converts speech to text, and has been shown to provide a 35% increase in speech comprehension during verbal communication.[16] Noise cancellation technology could also be a viable addition to an operating room communications system and would not affect speech identification.[17] Noise cancelling headphones are utilized in aeronautics to decrease ambient sounds, which often range from 65 to 80 dB in commercial aircraft cabins.[18,19] Molesworth et al demonstrated that noise cancelling headphones improve recollection of words compared to when the headphones are not used in a simulated aircraft cabin.[20] These headphones could be adopted by members of the surgical team to decrease the effects of ambient noises in the OR on cognitive processes and improve retention of instructions and information.

Radio technology has improved communication in automobile racing and professional football. The radio technology used in race cars has the potential to enhance OR communication by allowing members of the operating crew to easily communicate by wearing head phones with radio communication technology inside of it.[21] Similarly, in professional football, radio receivers in the quarterback's helmet allow the coach to provide direct and instantaneous feedback without removing the quarterback from the game. The receivers in the helmet have recently been enhanced by switching from analog to digital, which improves the sound quality and communication between the coach and player.[22] The convenience of the two-way radio used by NASCAR drivers and the quality of transmission from football helmet receivers could be combined to create a headset that enables a surgeon to clearly communicate with the surgical team during the operation, decreasing time delays and increasing OR efficiency and patient safety. Although communication technology in the OR is in its infancy, there are many opportunities for improvement.[23]

There are several limitations of this study. Despite being significantly better than the robotic communication system currently in use, our experimental system still resulted in an overall accuracy of only 81.3%. This still means that almost one fifth of communication was still not correctly interpreted. Certainly, future studies could try to improve communication with the goal of correctly interpreting 100% of communication events. In addition, our experimental model utilized a simulated OR, which may not entirely replicate every noise and distraction encountered in an actual operating room. Although a tape of actual robotic operating room noises was utilized to replicate the acoustic setting in the OR, performing high-stakes tasks in an OR setting may inhibit speech communication.[24] One study using medical students in a simulated venipuncture scenario found that subjects prioritized task completion over listening to communication, causing a deterioration in their listening capacity.[24] We concur that parallel multitasking would add more context to our study design and would be a relevant topic for further study in the future. The results of this study cannot be generalized to other nonrobotic surgical modalities. Barriers to effective communication during open surgery may exist, and are not evaluated in the current study but would represent a potential fertile ground for future research. Also, since the Bluetooth utilized in the wireless system relied on the wireless internet available in the OR, internet inconsistencies could have decreased the accuracy of communication with the wireless system. A final limitation of this bench-top study is that the phrases read from the primary console were spoken outside of any context. Typically, an OR team would be aware of the progress of a surgery, and might anticipate specific communication events and needs of the surgeon. While our study used phrases obtained from live robotic cases, the subjects did not have the benefit of situational context during the study. However, even with this limited word-bank format, the subjects did not improve in their phrase recognition as the study progressed. Despite these limitations, the wireless system still performed better than the robotic system. The next step for further improving the findings of this project would be to execute a clinical observation study examining the incidence and impact of miscommunication in a robotic OR.

CONCLUSION

Utilizing an additional wireless audio communication system can significantly improve communication between the primary console surgeon and the bedside assistant, anesthesiologist, and circulating nurse during robotic surgery. Reducing intraoperative miscommunication may reduce operative delays, resource wastes, and patient complications. Improved communication may also enhance the synergy of an OR team.

A scale from 1 to 10 comparing the clarity and effectiveness of the robotic speakers (RS) and the wireless system (WS). The ratings of the wireless system were higher than those of the robotic speakers.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.1016/j.urology.2018.07.059.

References

1. Ng ATL, Tam PC. Current status of robot-assisted surgery. *Hong Kong Med J*. 2014;20:241–250.
2. Randell R, Greenhalgh J, Hindmarsh J, et al. Integration of robotic surgery into routine practice and impacts on communication, collaboration, and decision making: a realist process evaluation protocol. *Implement Sci*. 2014;52:9.
3. Healey AN, Benn J. Teamwork enables remote surgical control and a new model for a surgical system emerges. *Cognit Technol Work*. 2008;255:11.
4. Catchpole K, Perkins C, Bresee C, et al. Safety, efficiency and learning curves in robotic surgery: a human factors analysis. *Surg Endoscic* 2016;30(9):3749–3761.
5. Stringer B, Haines TA, Oudyk JD. Noisiness in operating theatres: nurses' perceptions and potential difficulty communicating. *J Perioper Pract*. 2008;384:18.
6. Katz JD. Noise in the operating room. *Anesthesiology*. 2014;894:121.
7. Schwela DH. The new World Health Organization guidelines for community noise. *Noise Control Eng J*. 2001;193:49.
8. Greenberg CC, Regenbogen SE, Studdert DM, et al. Patterns of communication breakdowns resulting in injury to surgical patients. *J Am Coll Surg*. 2007;533:204.
9. Way TJ, Long A, Weihing J, et al. Effect of noise on auditory processing in the operating room. *J Am Coll Surg*. 2013;933:216.
10. Lingard L, Espin S, Whyte S, et al. Communication failures in the operating room: an observational classification of recurrent types and effects. *Qual Saf Health Care*. 2004;330:13.
11. Christian CK, Gustafson ML, Roth EM, et al. A prospective study of patient safety in the operating room. *Surgery*. 2006;159:139.
12. Lingard L, Espin S, Rubin B, et al. Getting teams to talk: development and pilot implementation of a checklist to promote interprofessional communication in the OR. *Qual Saf Health Care*. 2005;340:14.
13. Gawande AA, Zinner MJ, Studdert DM, Brennan TA. Analysis of errors reported by surgeons at three teaching hospitals. *Surgery*. 2003;133:614–621.
14. Nagpal K, Vats A, Lamb B, et al. Information transfer and communication in surgery: a systematic review. *Ann Surg*. 2010;225:252.
15. Halverson AL, Casey JT, Andersson J, et al. Communication failure in the operating room. *Surgery*. 2011;305:149.
16. Zekveld AA, Kramer SE, Kessens JM, et al. The benefit obtained from visually displayed text from an automatic speech recognizer during listening to speech presented in noise. *Ear Hear*. 2008;838:29.
17. Korhonen P, Kuk F, Lau C, et al. Effects of a transient noise reduction algorithm on speech understanding, subjective preference, and preferred gain. *J Am Acad Audiol*. 2013;845:24.
18. Elliott, S.J.: Active noise control. In: Crocker,M., Handbook of Noise and Vibration Control. Hoboken, NJ: John Wiley & Sons; 2007. p. 761−769.
19. Ozcan HK, Nemlioglu S. In-cabin noise levels during commercial aircraft flights. *Can Acoust*. 2006;34:31–35.
20. Molesworth BR, Burgess M, Kwon D. The use of noise cancelling headphones to improve concurrent task performance in a noisy environment. *Appl Acoust*. 2013;74:110–115.
21. Nascar Communications. Then & now. onboardz.com. Available at: http://onboardz.blogspot.com/2012/01/nascar-communicationsthen-now.html. Accessed July 26, 2017.
22. Technology. National football league. Available at: http://operations.nfl.com/the-game/technology/. Accessed July 26, 2017.
23. Coiera E, Tombs V. Communication behaviours in a hospital setting: an observational study. *BMJ*. 1998;673:316.
24. Woods B, Byrne A, Bodger O. The effect of multitasking on the communication skill and clinical skills of medical students; *BMC Med. Educ*. 2018;18:76. https://doi.org/10.1186/s12909-018-1183-5.

EDITORIAL COMMENT

The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.

—Bill Gates

The operating console can be a lonely place. Forehead firmly affixed . . . shoes off . . . Lil' Wayne playing on the Bluetooth speaker, the senior surgeon in the room may have little concept of what is going on in the OR. Who is circulating? Which nurse anesthetist gave lunch? What is the urine output . . . what is the patient's blood pressure and why are pressors running? Without provocation, long stretches of the case can go by without surgeon engagement. Likewise, the isolating nature of robotic surgery can lull our circulating nurses, anesthesia providers, and easily distracted residents into stretches of boredom disrupted only through hand-held technology. Total command of the operating room environment was once the mark of an experienced and talented surgeon . . . to know who was in the OR, what the counts were, what fluids were running at what rate . . . total command. Perhaps too much emphasis has been placed on involving the team in the presurgical timeout and too little emphasis has been placed on involving the team in the actual operation. I have heard very talented robotic surgeons state that they prefer to be left alone while operating. Still others operate on a console removed entirely from the OR proper. So while technology has transformed a partial nephrectomy into an observation case, it has, as Bill Gates foretold, magnified the inefficiencies in our communication.

In this very interesting study that quintessentially focused on team member engagement (referred to as "synergy" by the authors), the investigators examined the impact of a wireless, hands-free audio system on verbal communication within a simulated OR environment. Participants were placed in their traditional OR locations. Prerecorded sounds were taken from a live procedure, combined with music and used as background noise. Surgical phrases were spoken by a Da Vinci Si console surgeon and expressed via the external Da Vinci Si speakers or through wireless headsets worn by the assistant robotic console surgeon, bedside assistant, circulating nurse, and anesthesiologist. The authors found that the wireless, hands-free system increased the accuracy of communication when compared with the conventional external Da Vinci Si speakers. They concluded that a wireless audio communication system may significantly improve communication among the surgical team and by doing so may avoid inefficiencies and improve patient safety.

Ultimately, I tend to agree with the authors that the communication clarity of the built-in Da Vinci speakers is subpar. Somehow I do not envision me wearing a wireless headset either . . . too likely to be thrown across the room “Steve Spurrier-style” and beset by its own peculiarities and limitations (as outlined in the manuscript). But we applaud the authors for recognizing that we are perhaps becoming less engaged with our OR staff, that we are all increasingly guilty of distraction and poor communication, and that we need to take our heads out of the console from time to time and turn down the Lil’ Wayne.

Dustin L. Whitaker, Wesley M. White, University of Alabama at Birmingham School of Medicine, Birmingham, AL; Department of Urology, University of Tennessee Medical Center, Knoxville, TN

https://doi.org/10.1016/j.urology.2018.07.059
UROLOGY 123: 155−156, 2019.

AUTHOR REPLY

> The single biggest problem in communication is the illusion that it has taken place.
> –George Bernard Shaw

The 27,000 pounds of thrust sucked the blood from my brain causing my peripheral vision to fade. The F-16 banked in a 6 G turn as we came back around to the target for the fifth and final run. As an Air Force surgeon being rewarded for service well done, I had listened carefully to the communication during the premission briefing, . . . or at least I THOUGHT I had. I vividly remembered the pilot telling me, “If we have a bird strike or I pass out, just eject.” We had been dropping ordinance during a training mission. On the final pass, the plane suddenly pitched violently toward the earth. A loud alarm announced our descent below the safe ceiling and suddenly a horrible sound came from behind my seat suggesting that the plane was breaking apart. In that fraction of a second, I considered ejecting to safety before we hit the ground. Fortunately, the pilot quickly pulled back on the stick and nosed us skyward. As I watched the target and ground disappeared behind us, I became acutely aware of how important communication really was. In my excitement to fly in a F-16, I had not appreciated that the final run was a low-level strafing using the 20-mm Gatling gun. As the sweat dried on my forehead, I understood that in war, the training for war, or in surgery . . . how NOT getting the complete communication could have potential dire consequences.

In the Air Force we called it “situational awareness”. Our training officer said, “If you don't have it you get dead.” At the time, it sounded melodramatic to a young physician, but the concept is important. Robotic surgery has made amazing advances, but these advances have come at the price of situational awareness. The surgeon can no longer use his ears, smell, and sense of feel to optimize patient outcomes. The scrub nurse cannot respond to the furrowed brow of the surgeon, anticipating his every wish. The remote location of the surgeon from the patient increases the importance of accurate communication, but also makes it more difficult to achieve.

We wholeheartedly agree that it is important to “pull our heads out” of the console every so often. We also agree that at times it might not hurt to turn down the music, although we might prefer vintage Eagles over Lil’ Wayne. Also if the urge to enact a Steve Spurrier-style moment arises, one can always keep a backup headset handy. Madonna, Lady Gaga, the secret service, NFL coaches, Seal Team 6, airline pilots, and all sorts of important and successful people have experienced the benefits of enhanced communication between team members using wireless headsets. Why should not we, as surgeons, also have the best possible communication to enhance the outcomes for our patients.

Alexander Thomas, Zahabiya Campwala, Mohamed Keheila, David Ruckle, Matthew Pierce, Braden Mattison, Benjamin West, Jerry Thomas, Patrick Hogue, Samuel Abourbih, D. Duane Baldwin,
Department of Urology, Loma Linda University Health, Loma Linda, CA

https://doi.org/10.1016/j.urology.2018.07.063
UROLOGY 123: 156, 2019.