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Improving verbal communication in critical care medicine☆

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Abstract Human errors are the most common reason for planes to crash, and of all human errors, suboptimal communication is the number 1 issue. Mounting evidence suggests the same for errors during short-term medical care. Strong verbal communication skills are key whether for establishing a shared mental model, coordinating tasks, centralizing the flow of information, or stabilizing emotions. However, in contrast to aerospace, most medical curricula rarely address communication norms during impending crises. Therefore, this article offers practical strategies borrowed from aviation and applied to critical care medicine. These crisis communication strategies include "flying by voice," the need to combat "mitigating language," the uses of "graded assertiveness" and "5-step advocacy," and the potential role of Situation, Background, Assessment, and Recommendation communication. We also outline the "step-back method," the concept of *communication "below ten thousand feet,"* the impetus behind "closed-loop communication," and the closely related "repeat-back method." The goal is for critical care practitioners to develop a "verbal dexterity" to match their procedural dexterity and factual expertise.

"Meant is not said,
Said is not heard,
Heard is not understood,
Understood is not done" [1]

1. Introduction

Human errors are the most common reason for planes to crash, and of all human errors, communication errors are number one [1-3]. Evidence suggests the same for adverse outcomes in critical care medicine [4-12]. However, in contrast to aerospace, most medical curricula focus on factual knowledge and procedural dexterity but rarely address verbal communication during evolving crises [4-11]. The airline industry felt compelled as lives and profits were at stake [2]. With medical errors believed to cause at least 80 000 annual deaths in the United States alone [13-14], we should be similarly motivated. Given the importance of communication, specialists in critical care should also be specialists in critical care communication. Our "verbal dexterity" should match our procedural dexterity and factual know-how.

2. The importance of communication for improving teamwork and crisis management

The impetus to improve communication and teamwork in aviation coincided with the observation that the modern jet "is too much airplane for one man to fly" [15]. In a similar vein, the complexity of modern critical care medicine means that it is rarely a solo pursuit. The etymology of the word "communication" means to "share, join, unite, or make

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understanding common" [12]. As a result, much of what means to function as a team or be a good leader equates with good communication [4-12]. Qualities of leadership include the ability to establish a shared mental model, to coordinate tasks, to centralize the flow of information, to establish a structure, and to stabilize emotions [12]. Verbal communication is the chief way that these vital goals are addressed during a crisis [4-5,12].

A mental model means an understanding of the situation, task, and resources [12,16]. If time allows, the leader is responsible for sharing mental models. In contrast, in time-critical situations, the leader has to verbally communicate a model that the team can share. In short, communication means ensuring everyone is "on the same page." Regardless, without a common or shared mental model, the cognitive resources of the entire team cannot be fully leveraged [16].

Fewer planes crash when the copilot is flying [2], which might seem contradictory, after all, senior pilots have more experience. Once we accept the importance of communication and shared mental models, it makes sense. Planes are likely safer with subordinates at the controls because, firstly, the senior pilot is unafraid to speak up and, secondly, the subordinate is actively involved [2,12]. As a result, more than 1 person flies the plane. In contrast, research shows that, during crisis, physicians often fail to communicate what they are doing or why [4,5,17-19]. When they do communicate, it is often only to other physicians, not the team. With nurses, there are often lengthy delays between when a problem is first identified and when this is shared with the team [6-9,20]. Medical teams often fail to achieve a shared mental model. Fortunately, other high-stakes professions have shown how much can be achieved by addressing communication norms.

3. Improving outcome by addressing communication and culture

The typical fatality rate for major first-world airlines is approximately 1 per 4 million flights [2,3]. In the 1990s, Korean Air was more than 17 times higher, and neither inexperience nor poor equipment was to blame [2]. Korean Air is now an award-winning airline with a superb safety record. It only succeeded when it acknowledged the importance of communication and its effect upon culture [2]. Investigators concluded that cockpit speech patterns, especially between junior and senior crew, were among the most common contributors to plane crashes [2,21-22].

Worldwide, airlines from cultures that are typically more reluctant to question authority experience more crashes [21-23]. National aviation regulatory boards (including Korea's), therefore, now demand "horizontal authority" and "horizontal communication" [2,21-23]. This means creating a culture that empowers subordinates to speak up and encourages senior members to listen [10]. Some languages (and Korean is a good example) require different word choices and sentence structure based upon the relative hierarchy of the speaker and recipient [2,23]. This can complicate communication at the same time that it perpetuates authority gradients. The same could be true of communication in hierarchical professions such as medicine. Unfortunately, many physicians still do not support or practice horizontal authority [10,15].

"Mitigating speech" refers to language that "de-emphasizes" or "sugarcoats" [2]. We mitigate speech to be deferential or polite or when embarrassed or unsure. The Korean language is characteristic for its use of "mitigating language" [2,23]. However, mitigating language is common before airline crashes, regardless of the airline or cockpit language. Predictably, a review of hundreds of hours of medical simulation recordings also found mitigating language to be a common feature of inadequate medical crisis management [19]. If time permits, then mitigating language can be harmless. In fact, it may even be preferable if the primary goal is team building rather than short-term resuscitation (eg "excuse me, but, when you get a moment, would you mind helping me with this patient?"). However, in a cockpit during nonroutine flights, it can be potentially deadly [2]. Presumably, the same is true during the short-term care of an unstable patient. The new Korean Airlines demanded an end to mitigating language, and so should critical care medicine.

Some languages (again, Korean is a prime example) are "receiver orientated" [23]. This means an expectation that the listener will make sense of what is being said. A "receiver-orientated" style is appropriate when the listener is capable of close attention or if time exists to unravel meaning. It does not work in a cockpit during inclement weather or with an exhausted flight crew. It is similarly not likely to help in a crowded resuscitation bay or with a stressed medical team. In contrast, western languages are typically "transmitter orientated" [23], meaning it is the responsibility of the speaker to communicate clearly and unambiguously. This means that there is an expectation that the speaker will make the effort to be understood, and if they fail, then it is the speaker's shortcoming—not the listener's. The revamped Korean Airlines also insisted upon "transmitter-orientated" language [2]. The message for critical care medicine is not that any one language is inherently superior but rather that verbal dexterity means using speech best suited to the situation.

In medicine, we accept the importance of communication skills when dealing with emotional families or disruptive colleagues. Furthermore, we are beginning to realize that the benefits associated with preoperative checklists are largely a result of increased team communication [24]. However, unlike aviation, medicine has yet to widely accept (or deliberately teach) the importance of verbal communication in crisis situations. Fortunately, crew resource management was developed to teach junior aircrew to communicate clearly and assertively. Gaba et al [10] and Gaba [11] have adapted these lessons to create medicine's crew resource management, where the abbreviation now stands for crisis resource management. As a result, practical strategies are readily available.

4. Strategies to promote verbal communication ("meant is not said")

As outlined above, verbal communication is essential to optimize teamwork [10]. However, stress and uncertainty mean that even experienced professionals can be prone to silence during crises [12]. In aviation, this is illustrated by the fact that the cockpit black box recorder is often silent for minutes before a crash [2]. Similarly, a common complaint after poorly coordinated resuscitation is that people failed to speak up [18]. This is why we cannot leave communication to chance, nor can we assume that all physicians are capable communicators. Pilots are deliberately taught to speak up or "to fly by voice" [10] (Table 1). This means that they are expected to routinely announce what they intend to do (eg, "I am taking over the commands in order to begin descent"). Similarly, health care personnel can be taught to "resuscitate by voice." A simple example during resuscitation would be—rather than silence or panic due to uncertainty—that the team leader should calmly address the team (eg, "we are 10 minutes into this resuscitation and still have no pulse…what are we missing?"). Similarly, if other team members routinely announce their intentions (eg, "I am going to give penicillin"), then it encourages a "double check": others can prevent this action if, for example, the patient has a contraindication.

As outlined above, combating mitigating language became a crusade for aviation [2]. It should become a priority for critical care medicine. Overly cautious or overly mitigating language is inappropriate during crises in the same way that overly brusque language is inappropriate when the goal is team building. The danger of mitigating language illustrates why, during medical crises, we should replace comments such as "perhaps, we need a surgeon" or "we should think about intubating" with "get me a surgeon" and "intubate the patient now." Communication during crises should still be polite but must also be unequivocal. This means learning to be appropriately assertive.

5. Strategies to improve assertiveness ("said is not heard")

When teaching assertiveness, pilots learn a graded approach using up to 6 strategies from least to most direct [2,10,12,18,25-27]. This "graded assertiveness" [18,25] includes the "hint" (eg, "should things look like this?"), a "preference" (eg, "I think it would be wise to do the following…"), a "query" (eg, "what do you think we should do?"), a "shared suggestion" (eg, "you and I should do the following…"), a "statement" (eg, "I think we need to do the following…"), and the "command" (eg, "do this now"). Without deliberate instruction, studies show that junior flight officers may rely upon a less direct style and frequently do no more than hint. Moreover, if hints are ignored, subordinates often fail to escalate their assertiveness. In contrast, senior pilot uses more commands, as they are less concerned about being blunt [2].

Aviation also teaches a 5-step approach focusing on advocacy and confirmation [18]. The following includes aviation examples along with medical corollaries: "attention

Table 1 Summary of practical strategies to enhance short-term medical communication

Communication strategy	Medical example
"Flying by voice"	"We still have no pulse…what are we missing?"
Combating mitigating language	"Get me a surgeon."
	"Intubate the patient now."
Graded assertiveness	Command: "Do this now."
	Statement: "We need to do the following…"
	Shared suggestion: "You and I should…"
	Query: "What do you think we should do?"
	Preference: "I think it would be wise…"
	Hint: "Should things look like this?"
5-step advocacy	Attention getter: "Excuse me, Doctor."
	State your concern: "Patient is hypotensive.
	State the problem as you see it: "I think we need to get help, now."
	State a solution: "I will arrange ICU transfer."
	Obtain agreement: "Does that sound good?"
SBAR	Situation: "I wish to sign over a patient."
	Background: "He is a 35-year-old trauma victim."
	Assessment: "He is at risk for infection."
	Recommendation: "Obtain cultures."
Step-back method	"Stop chest compressions, while I reassess the heart rhythm."
Below ten thousand feet	"I want your opinion…do you have time to listen?"
Closed-loop communication	"Intubate the patient…and tell me when it is done."
Repeat-back method	"Okay, so that is 3 mg of epinephrine."

getter": address the individual (eg, "excuse me, Captain/Doctor"), "state your concern": use clear language and include your own worry (eg, "we are low on fuel/the patient is becoming increasingly hypotensive"), "state the problem as you see it" (eg, "I do not think we have enough fuel to take evasive action/I think we need to get help from critical care now"), "state a solution" (eg, "let us reroute to another airport/I will telephone ICU to arrange transfer"), and obtain agreement (eg, "does that sound good, Captain/Doctor?").

Situation, Background, Assessment, and Recommendation (SBAR) communication originated with the military but is well suited to any medical situation that benefits from a formal structure. This includes transferring medical care, obtaining other opinions, or summarizing complex patients. Situation, Background, Assessment, and Recommendation divides communication into 4 sections: situation, background, assessment, and recommendation [20]. An example of SBAR would be situation "this is Dr X, I wish to sign over a patient," background "he is a 35-year-old trauma victim from last week," assessment "he is surgically fixed but is at risk for infection," recommendation "I would suggest cultures if he becomes febrile." Regardless, it is one thing to ensure that you, as a communicator, speak clearly and comprehensively. The next issue is how best to be understood.

6. Strategies to improve understanding ("heard is not understood")

Psychologists talk of the "framing effect." This is how different decisions may be made depending upon how similar information is presented [12,18,28,29]. Both the specific words that we speak and how they are understood can change based upon stress, workload, culture, and the relative seniority and profession of those involved [12,21-22, 29-32]. Medical crises can engender strong emotions but overly aggressive (or overly passive) speech is inappropriate [12,28]. This is because this changes the interaction from one focused on task to one focused on power [12,28]. In other words, the communication is inappropriate because it is no longer patient focused [10,12]. Cooperative language is preferable, but, again, things are more complex. Cooperative language is best suited when there are minimal authority gradients or during a planned hand over of control [12]. Often, in critical care medicine, practitioners need to *take over* control. As such, a more assertive style is needed, and as long as that interaction remains patient focused, it is appropriate and likely to be understood [10,12,18]. To quote Gaba et al [10], "we must focus on *what* is right for patients rather than *who* is right."

Another communication strategy is the "call out" [18]. This means "speaking up" to other team members while completing a task (eg, "I have increased the oxygen flow rate"), following an important changed (eg, "listen to me, the blood pressure has dropped"), or when something appears to be wrong (eg, "he is going back into ventricular fibrillation"). This strategy can also be used preemptively (eg, "the fluid is in, would you like more?"). The step-back method [17] means verbally forcing a "time-out" to reflect on the course of events (eg, "stop chest compressions, I want to reassess the heart rhythm"), to reassess prior assumptions (eg, "stop, is that still ventricular fibrillation?"), or to question the efficacy of the action plan (eg, "please stop what you are doing; I need you to listen to me").

The skilled leader also understands the limits of verbal communication [12]. For example, although communication can motivate and focus a team, it cannot actually complete a task. As such, skilled communicators also need to confirm what has and has not been done. This is important in both aviation and critical care medicine, given the number of concurrent tasks, the complexity of many tasks, and the likelihood of interruptions.

7. Strategies to improve task completion ("understood is not done")

Flight crash investigators identified cockpit interruptions to be such a major safety concern that they are now addressed in the standard operating procedures [33]. These communication rules promote the "sterile cockpit rule" to minimize distractions, especially when a commercial airliner is flying below ten thousand feet [32-34]. This is because commercial airliners are only below ten thousand feet during critical phases of flight. These include taxi, take-off, landing…, or impending crash! [32-34]. As such, no unnecessary talk is allowed when below ten thousand feet [32-34].

The concept of *below-ten-thousand-feet communication* [32-34] illustrates why medical practitioners should reserve comment during procedures such as intubation. In other words, the physician is understood to be below ten thousand feet. For the same reason, a surgeon should avoid unnecessary noise during anesthetic induction (ie, the anesthetist is below ten thousand feet). Similarly, the anesthetist should resist idle chatter during the subsequent operation, that is, the surgeon is now below ten thousand feet, although the anesthetist no longer is. In the emergency department, this concept also explains why we should confirm if others are free to listen (eg, "I want your opinion on a complex patient, can we talk now or later?"). Regardless of whether medical personnel ultimately use the actual words "below ten" (eg, "I will have to get back to you, I am below ten thousand feet"), this concept could empower team leaders to demand that other focus their comments. It should also minimize the offense of those being silenced.

A common strategy to confirm task completion is to demand the "3 Cs of communication." This means using clear instructions, citing names, and, most importantly, closing the loop [10-12,35]. This third component, closing the loop, means to confirm task completion by demanding

feedback (eg, "John, please intubate the patient, and tell me when it is done"). "Closed-loop communication" has been widely taught in aviation [10-11]. Similar to closed-loop communication is the repeat-back method [18]. This means repeating to confirm mutual understanding (eg, a nurse repeats an order from a physician…"okay, so that is 3 mg of epinephrine"). The "read-back method" [18] means reading back a verbal order before processing it or confirming a telephone order before hanging up.

8. In closing

Verbal communication during crises is a major determinant of outcome, whether in aviation or critical care medicine [1-12]. Optimizing crisis communication is of paramount importance for patient safety. It is, therefore, a vital topic that deserves immediate attention. Fortunately, many practical strategies already exist. There really is no excuse not to address this "missing curriculum" [17].

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