One More Checklist?

Since Atul Gawande's publication in 2009 of *The Checklist Manifesto*, it seems that checklists are everywhere in medicine. I discussed this in an editorial 2 years ago. Specifically, I asked everyone if they had developed a checklist for airway emergencies that could be used by sedation and general anesthesia providers, but also dental assistants helping with sedation. I also stated,

"As checklists move from the hospital and ASC to the dental office, as they likely will, it will probably be sedation and general anesthesia-trained dentists who will be at the forefront of bringing sensible policies and procedures to the dental office. In this way, the readers of *Anesthesia Progress* will hopefully make a profession wide contribution to enhancing safety in dental practice more generally."

Well, over these past several months, I have had the privilege of working with a very talented group of dentist general anesthesia (GA) and sedation providers who are working under a grant from the Anesthesia Research Foundation of the American Dental Society of Anesthesiology (ADSA). We are developing a smartphone app for use in medical and sedation/GA emergencies in the office-based setting. Although initially geared to dental practice, the app would certainly also be applicable to other office-based physicians and medical providers. The app is specific as to provider type: general practitioner, moderate sedation provider, and general anesthesia provider. This app has algorithms for the common medical, sedation, and general anesthesia emergencies/urgencies that occur in our practices. We hope to roll out the app at the ADSA Annual Session in Boston this spring.

The whole process has been a rather enlightening one. While I have rehearsed many algorithms of various types of emergencies for years for myself personally and in my teaching, putting an actual step-by-step algorithm down on paper is quite demanding. Do you ensure 100% oxygen administration first for anaphylactic shock or do you administer epinephrine first? Do you suction the airway or deepen the anesthetic or give positive pressure oxygen as the first step in treating laryngospasm? These are just examples. They have highlighted to me how difficult it is to write an emergency algorithm that might apply in all (at least most) situations. And there has been vigorous debate on what should even be done, in what order, and how

evidence-based our choices are. Many of us might think that Trendelenburg is the first step in syncope without an IV line, but there is little evidence that this position, or just raising the legs, significantly affects blood pressure!

When confronted with developing a written emergency algorithm, I have gained an appreciation of how much goes into my decision of what I do first and the order of what follows. Is this an adult or a child? Does the patient have cardiac issues? Pulmonary problems? Diabetes mellitus? If this problem develops intraoperatively, what has been the patient's course over time as I have closely monitored them for the previous minutes or hours? Although their pressure or ventilation parameters were all within a reasonable range that might be unnoticed if taken as a spot check, have they been subtly changing? Have I had to make adjustments to ventilation via medications if spontaneously breathing or via the ventilator? Have I given pressors or beta blockers/vasodilators? Have I decreased or increased anesthetic drugs frequently? What is the quality of their breath sounds and capnograph waveform? All of these parameters go into my decision, thus making a written algorithm challenging.

Although our app lists many different conditions that may arise, what is the universal emergency algorithm that we apply almost unconsciously? Certainly, my first concern, as it is for any sedation or GA provider, is always airway. Is the patient ventilating and is their oxygenation acceptable? Except for certain patients with congenital heart disease and in the setting of acute myocardial infarction, 100% oxygen is virtually always good in a ventilation/oxygenation problem. Airway is always the number one factor to assess and manage. Surveying the cardiovascular parameters is next, followed by knowing exactly what drugs have been given. Treatment of any life-threatening conditions, via ACLS, intubation, etc. then takes priority. Most emergencies, however, develop over time and a differential and working diagnosis can be formulated.

It is here that a checklist or smartphone app is most helpful. As humans we are prone to developing tunnel vision in an emergency. If we can see a list of possible problems and a management strategy, we help ensure that we are not missing an important step in treatment or an alternative diagnosis. An even greater benefit to the app, in my opinion, is to review the algorithms regularly BEFORE any emergency occurs, like we do with ACLS every 2 years. Is your own personal algorithm the same? If not, why not? Did you remember all the steps that were listed? Certainly, during an emergency, you may not have time to look at an app.

But one of the staff members can and read the algorithm to you to confirm that you have not missed any steps. This takes training. And a staff willing to act as a true team member with you, so called Crew Resource Management.

It has been a great opportunity to work with my colleagues from all walks of dentistry to develop these

algorithms. It is my hope that this technology will improve emergency management in our practices. It will initially be free for all ADSA members, so please take advantage of this resource when it becomes available very soon.

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