Cervical Injury after Videolaryngoscopy in Patient with Ankylosing Spondylitis: Comment

To the Editor:

The recent article by Epaud *et al.*[1] reinforces the need for anesthesiologists to be comfortable with the flexible fiberoptic intubation technique. I read with great concern that a neurologic injury occurred because of the choice of videolaryngoscopy as the intubation approach because the operator was more familiar with that technique. Was the decision to use videolaryngoscopy a result of our anesthesiology training programs shifting the focus of difficult airway training to videolaryngoscopy because this technique is readily available and relatively easy to use compared to flexible fiberoptic intubation? It has been demonstrated that videolaryngoscopy does not significantly reduce cervical spine movement compared to direct laryngoscopy[2] and, unfortunately, patient harm occurred in the authors' case presentation.

The authors endorse that flexible fiberoptic intubation could have been used to avoid injury; the use of fiberoptic intubation mitigates cervical spine movement because it is flexible and can be manipulated in difficult anatomy presentations. A randomized clinical trial showed that there was no difference in intubation time and success rate[3] between videolaryngoscopy and flexible fiberoptic intubation in experienced hands. That is the key: experience!

Anesthesiology residency programs should not compromise training in flexible fiberoptic intubation because of the relative ease of use and convenience of videolaryngoscopy, and American Board of Anesthesiology/Accreditation Council for Graduate Medical Education requirements should reflect this.

Competing Interests

The author declares no competing interests.

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To the Editor:

We express our condolences to Epaud *et al.* and to their patient with ankylosing spondylitis who experienced a C5–C6 cervical spine fracture in association with a difficult videolaryngoscopic intubation.[1] Their image report adds to existing reports of intubation-mediated cervical spine injury in patients with ankylosing spondylitis and conveys several important clinical messages.

The first message is neither glottic visualization nor intubation success are guaranteed with videolaryngoscopy. Clinical studies in which cervical spine mobility is artificially restricted—using either manual in-line stabilization or cervical collars—indicate that compared to conventional direct laryngoscopy, videolaryngoscopy: (1) improves glottic view with most but not all videolaryngoscopes and (2) increases first-attempt intubation success with only a few (n = 5) videolaryngoscopes but is not 100%.[2] In two reports of 20 and 30 patients with ankylosing spondylitis

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in whom the GlideScope (Verathon, USA) was used for intubation, it was not possible to visualize the glottis in 13 to 15% or intubate in 7 to 15%.[3,4]

The second message is that techniques intended to limit cervical spine motion during intubation can have adverse effects. Epaud *et al.* reported use of "in-line traction" during intubation.[1] In the presence of cervical spine instability, axial traction can cause severe axial distraction.[5] Consequently, manual inline stabilization, which does not utilize axial traction, is the method commonly used to reduce intubation-mediated cervical spine motion. Nevertheless, in two cadaver intubation studies, when compared with conventional laryngoscopy, manual inline stabilization did not change the motion of unstable cervical segments,[6,7] and in one study, it increased pathologic motion (subluxation).[5] Increased pathologic motion with manual in-line stabilization is most likely explained as follows: first, by decreasing cervical spine motion, this technique impairs glottic visualization[8,9]; second, when glottic visualization is impaired, anesthesiologists may apply greater laryngoscope force, either with[9] or without manual in-line stabilization[10]; and third, in the presence of an unstable segment, greater laryngoscope force application may result in greater segmental motion.

The third message is that clinicians should not assume that videolaryngoscopes always apply less force than conventional laryngoscopy. In patients predicted to be easy to intubate, videolaryngoscopes apply less force than conventional direct laryngoscopy.[11–13] However, in a study of patients who had risk factors for difficult direct laryngoscopy, peak intubation forces did not differ between conventional direct (Macintosh) laryngoscopy and GlideScope laryngoscopy.[10] In this latter study, failed intubation occurred in 5 of 20 (25%) of the Macintosh patients and 3 of 24 (12%) GlideScope patients and, in both groups, peak intubation forces were greater in patients in whom intubation failed. In their report, Epaud *et al.* state that there were "difficulties in exposing the epiglottis" and a bougie was utilized.[1] Therefore, because of impaired glottic visualization, it is likely Epaud *et al.* applied a greater amount of force with the videoscope than they would have normally, causing the fracture.

Based on the aforementioned points, the fourth message is that there continues to be a role for fiberoptic intubation in airway management of patients who have ankylosing spondylitis and other forms of cervical spine disease. Epaud *et al.* state "…both videolaryngoscopy and fiberoptic intubation were considered…[but]…videolaryngoscopy was preferred because the operator was more familiar with this technique."[1] Because there are case series of patients with ankylosing spondylitis who were safely intubated with videolaryngoscopes,[3,4] the decision of Epaud *et al.* to use videolaryngoscopy instead of fiberoptic intubation was understandable. However, when performed well, fiberoptic intubation secures the airway with little to no force applied to the cervical spine; for patients with ankylosing spondylitis, that is vitally important. Accordingly, fiberoptic intubation continues to be an essential airway management technique with which anesthesiologists should maintain expertise.

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Competing Interests

The authors declare no competing interests.

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In Reply:

We thank Drs. Hindman and Dexter[1] and Dr. Cometa[2] for their interest in our image in clinical medicine relaying a cervical spine injury secondary to videolaryngoscopy.[3]

The main purpose of this image is educative, highlighting airway management in patients with ankylosing spondylitis as well as limits of the use of videolaryngoscopy. In the last decade, the use of videolaryngoscopy has been generalized to operating rooms and intensive care units worldwide. Its use has been widely recommended for use in difficult airway management, and it is now the first choice of most anesthesiologists, due to its accessibility.

We agree with Drs. Hindman and Dexter that although videolaryngoscopy improves visualization of the glottis, it may not facilitate catheterization of the trachea and may cause the operator to apply more force than intended. Moreover, it is important to note that even manual inline stabilization does not preclude the motion of an unstable cervical segment.[4]

Because of this, all anesthesiologists should train and be comfortable with fiberoptic intubation, which may be more appropriate in some cases, as underscored by Dr. Cometa's comments. Training for fiberoptic intubation should begin during residency but should be pursued and developed further in each anesthesiologist's practice. Indeed, an initial training that is *not* followed by regular use of fiberoptic intubation could lead an anesthesiologist to inappropriately choose videolaryngoscopy if that is a more familiar technique. We believe that certain situations—such as those occurring in patients with ankylosing spondylitis—benefit from a choice in intubation technique, determined during the preanesthesia evaluation and with a formal indication discussed and agreed upon by the full anesthesiology team. As highlighted by Dr. Cometa, severe complications would not occur as a consequence of a single operator's preference, or based upon the availability and ease of use of videolaryngoscopy compared to fiberoptic intubation.[5] In conclusion, in selected cases of spine fragility (*e.g.,* in patients with ankylosing spondylitis), the ready availability and ease of use of videolaryngoscopy may actually be a poisoned gift.

Competing Interests

The authors declare no competing interests.

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