



Doctor's docket

Trust but verify: cooperation cannot mean abdication in the operating room

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1. Facts

On 10/21/98, H, a 5-year-old girl, was admitted to the hospital for a tonsillectomy. H had a history of 5 previous surgical procedures.

On 9/25/98, H was prescreened for anesthesia by certified registered nurse-anesthetist (CRNA) A, an employee of the hospital, who reviewed H's medical data, interviewed and examined H, as well as interviewed H's mother. CRNA A's prescreen report on H indicated "trouble [with] airway according to mom" and "small airway, limited mouth opening," and "difficult mask but saturation okay."

On the morning of H's surgery, CRNA K examined H to ensure that no significant changes had occurred since her prescreening. CRNA K completed a checklist and handed that checklist to Dr B, a board-certified pediatric anesthesiologist and the attending anesthesiologist in charge of H's anesthesia that day.

Dr B reviewed the prescreen report; she also reviewed the medical records for H's most recent surgical procedure that occurred 5 months earlier. They indicated that during the previous surgery "[the anesthesia team] had no trouble visualizing the larynx, the epiglottis, the base of the cords ... felt so comfortable with it, not only did they put one tube in, but they took it out and put a larger tube in." Dr B believed that, although H was a "difficult mask," just 5 months earlier an inhalation induction had been the appropriate procedure for H.

Dr B was assisted by fellow Dr S and CRNA G. Dr W was H's ear-nose-throat physician and who was most familiar with H's medical conditions and was to perform the tonsillectomy procedure. Dr B and Dr W had worked together on surgeries involving difficult airways for years.

Dr B planned induction by "breathing H down" quickly and then to intubate her, and if that plan was unsuccessful, Dr W would use a fiber-optic scope to assist him visually in intubating H. If the tube could not be properly placed with the aid of the fiber-optic scope, Dr B planned to ask Dr W to perform a tracheostomy.

Dr B did not discuss this plan with Dr W on the day of H's surgery because Dr B felt that she and Dr W had worked together for years, he already knew that H had a difficult-airway, and he was aware of the plan required for difficult

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airways. Dr B did meet briefly with Dr S before H's surgery, and they discussed the prescreen report and Dr B's thoughts on the anesthesia plan.

H's anesthesia began at approximately 8:12 AM. H was masked with sevoflurane mixed with nitrous oxide to induce H quickly. In H's previous 5 surgeries, a similar method had been used. After the induction began, CRNA G started H's intravenous anesthesia (IV). The IV was not started before H's induction because the team "knew [attempting to start an IV] would upset [H] and [they] knew it would be almost impossible to start it beforehand, so [they] did the inhalation induction and got the IV started then so she wouldn't be aware of it." After the induction began, H immediately developed a laryngospasm. Dr B treated H's laryngospasm by changing the nitrous oxide and sevoflurane to halothane and administering lidocaine and mivacurium to open her vocal cords.

After Dr B administered the mivacurium, Dr S made the first attempt to place H's endotracheal tube. The anesthesia monitors indicated that this first attempt occurred at 8:20 AM. His first attempt was unsuccessful, and he attempted to place the tube again, but because he could not visualize the airway, he handed off responsibility for the intubation to CRNA G, who was more experienced. CRNA G's first attempt was unsuccessful; she removed the tube, masked H again with oxygen, and then made a second attempt. According to Dr B, CRNA G successfully intubated H around 8:23 AM. An end-tidal CO₂ reading was obtained, and Dr B heard breath sounds. However, within a very short period, Dr B noted that H's end-tidal CO₂ readings became intermittent. Dr B became concerned about a bronchospasm.

Because H's oxygen-saturation levels and her end-tidal CO₂ readings were erratic, H's ventilation monitor alarms began sounding. At approximately 8:24 AM or 8:25 AM, with the alarms still sounding, Dr W insisted on attempting to place the tube. Dr W placed H's tube and stated to the anesthesia team that he "was in." Dr B kept asking Dr W about the tube he had placed, and he kept insisting that it had been properly placed in H's airway.

Within one to two minutes of Dr W's placing the endotracheal tube, H had a cardiac arrest. A code was called and emergency resuscitative efforts were undertaken. Although H had no end-tidal CO₂ readings after Dr W's intubation, her oxygen-saturation readings began increasing during resuscitation. However, H's saturation readings quickly leveled off in the 70s. The fact that the saturation levels were no longer rising prompted Dr B to then attempt to confirm visually whether Dr W had properly placed the endotracheal tube. Approximately 5 minutes elapsed between the time Dr W attempted to place the endotracheal tube and the time Dr B attempted to confirm visually whether the tube was properly in H's trachea.

Dr B and CRNA G discovered that Dr W's tube was in the esophagus. CRNA G then attempted to place another ventilation tube. Approximately two more minutes elapsed before H was successfully intubated. After the intubation by

CRNA G, an end-tidal CO₂ reading was immediately established. No end-tidal CO₂ readings for H had been recorded by the Narkomed (Drager Medical, Inc., Telford, PA) machine from approximately 8:24 AM until 8:31 AM.

H left the operating room in a vegetative state. She died on 11/29/01.

H, through her mother, sued Dr B for medical malpractice, claiming Dr B fell below the standard of care in not appropriately verifying and managing the intubation and anesthesia emergency. Dr B indicated she followed the standard of care in all aspects of H's surgery and emergency situation.

At trial, testimony was introduced indicating that for approximately 4 to 5 minutes after Dr W's placement of the endotracheal tube, Dr B did not attempt to confirm or instruct anyone else to confirm the placement of Dr W's tube. Although H showed none of the confirmatory signs of ventilation typically relied upon by anesthesiologists—end-tidal CO₂ readings, chest rising, or breath sounds—Dr B did not use a fiber-optic scope, and she did not request a tracheostomy.

Dr B acknowledged the lack of end-tidal CO₂ readings, but she stated Dr W was insistent that the tube had been placed in the airway and she knew that a lack of end-tidal CO₂ readings could result from causes other than improper endotracheal tube placement. Dr B attributed H's lack of end-tidal CO₂ readings to bronchospasm. Dr B testified that a bronchospasm is a recognized cause of a lack of end-tidal CO₂ readings despite a properly placed endotracheal tube. According to Dr B, H appeared to respond to the treatment for a bronchospasm.

Dr B also testified that she weighed the benefit to be gained from immediate verification of the endotracheal tube against the risks of discontinuing what she believed to be H's ongoing ventilation. In her analysis, the best decision at that time and under the circumstances was to trust Dr W's judgment that he "was in" and to treat what she had diagnosed as a bronchospasm.

Dr B did not ask Dr W to perform a tracheostomy because, she said, she knew he would refuse. She testified that, in response to her queries, Dr W kept insisting that the endotracheal tube was properly placed in H's airway; Dr B testified that it would have been pointless to ask Dr W, who believed and repeatedly insisted that his endotracheal tube had been properly placed, to perform an emergency tracheostomy. Furthermore, she noted, after the anesthesia team discovered that Dr W's tube had not been properly placed, CRNA G was able to properly intubate H. Dr B testified that if intubation was still a possibility, there was no need to ask for a measure as drastic as an emergency tracheostomy on a 5-year-old child.

However, Dr W stated that if Dr B had requested a tracheostomy, he would have performed one. Furthermore, one of Dr B's associates had indicated in H's medical records that, because of her difficult airway, H might require a tracheostomy when undergoing future anesthesia.

Dr B acknowledged that ventilating H was her responsibility and that Dr W was not responsible for ventilating H and he was not trained in operating the Narkomed anesthesia machine, which monitored end-tidal CO₂ readings. However, Dr B also testified that she felt the most important factor was H's oxygenation level, and until H's oxygen-saturation readings leveled off in the 70s, she did not believe it was imperative to determine whether Dr W's tube was in the trachea or in the esophagus. Dr B testified that she believed throughout the time that Dr W was insisting that his tube was in place that she was successfully treating H's bronchospasm.

H's expert Dr D testified that there were multiple failed attempts at intubation over a protracted period, at least from 8:10 until 8:31 AM when H was finally intubated. At 8:35 AM, according to the medical records, H had a cardiac arrest and, in his opinion, this cardiac arrest was due to protracted oxygen deprivation and lack of oxygen ventilation that should have been addressed by Dr B and CRNA G. Dr D noted according to the anesthesia record, H had extremely low oxygen saturations from 8:17 AM and for many minutes thereafter and that there was no record of carbon dioxide exchange, except on two occasions after that period. These data show that H was not being properly ventilated and should have been recognized as the medical complications from deprivation of oxygen. Dr B's delay in providing ventilation and failing to respond to this lack of ventilation contributed to H's hypoxia and ultimately the cardiac arrest and brain damage that she incurred.

The trial court then instructed the jury that:

"A physician such as Dr. B is under a duty to inform herself of the condition of her patient, but she is justified in accepting as correct the diagnosis of the preliminary examination of another physician in good standing and she may act thereon."

After retiring for deliberation, the jury found for Dr B.

H appealed. H indicated that this instruction was misleading and incorrect as applied to the case. H argued that the very heart of the case was that Dr B breached the standard of care for ventilating H by relying on Dr W's placement of the endotracheal tube rather than verifying herself that the tube had been properly placed and when she ignored confirmatory data indicating H was not properly ventilated. H argued that the undisputed standard of care places the burden on the anesthesiologist to promptly confirm that the endotracheal tube has been properly placed and Dr B did not conform to that standard. Dr B argued the trial court was correct and she could rely on another physician's conclusion regarding the intubation.

2. Legal analysis

The Supreme Court of Alabama reversed the judgment for Dr B and remanded the case for a new trial (Prowell v

Children's Hospital and Kathryn Brock, MD, 949 So.2d 117 (Ala. 2006)).

The court first noted that if an improper jury instruction is given by the trial court, this event constitutes reversible error and entitles the adversely affected party to a new trial. The appellate court also noted that in its assessment of whether a jury instruction is improper, it should assess it as a whole in the context of the case and whether any error has injuriously affected the substantial rights of any party.

The court reviewed the instructions for the jury in the context of a medical malpractice case. After reviewing the instructions as a whole, the court concluded that there was reversible error and agreed with H.

According to the court, under the facts of this case, amongst others, the instruction:

[Dr B] is justified in accepting as correct the diagnosis of the preliminary examination of another physician in good standing and she may act thereon ...

was problematic. Such an instruction implied that Dr B had a right to rely on Dr W's assessment of the success of the intubation. This instruction, concluded the court, was misleading and confusing to the jury.

From the court's perspective, the jury instruction removed from the jury's consideration a pivotal issue in the case—whether, by relying on Dr W's oral assessment of the intubation, Dr B's actions fell below the standard of care applicable to her in caring for H and monitoring her ventilation during the surgery. Because the jury instruction stated that Dr B was entitled to rely on Dr W's assessment, the instruction did not allow the jury to determine whether, in light of the factual and expert evidence submitted to them, Dr B breached the applicable standard of care by failing to verify herself that H was properly intubated and ventilated. The court noted that this issue was of primary importance and for the jury to decide.

The court hence concluded that under the facts of the case, the instruction to the jury—that Dr B was entitled to rely on Dr W's assessment of H's situation—was misleading and confusing because the instruction removed from the jury's consideration one of the pivotal issues in the case. As such, it injuriously affected the substantial rights of H. The appellate court then reversed the judgment of the trial court that held for Dr B and remanded the case for a new trial.

3. Commentary: Kha M. Tran, MD

A pivotal legal issue in this case revolves around an instruction that was given to the jury by the trial court. This instruction gave Dr B the right to accept the judgment of Dr W that he had successfully intubated the patient H. With an instruction such as this, and given Dr W's insistence that he had correctly intubated the trachea, any jury would surely find for Dr B. However, after an appeal, the Supreme Court of Alabama found this instruction improper, reversed the

judgment of the trial court, and remanded the case for a new trial. Given the ruling of the appellate court, the new question becomes one of Dr B's adherence to the standard of care in accepting another physician's word that he had, in fact, properly placed the endotracheal tube. The answer to this question is easy, but the facts of this case make matters more complicated.

Accepting the word of another practitioner that an endotracheal tube has been properly placed clearly falls below the standard of care when intubating with residents, fellows, nurse-anesthetists, or other colleagues, when taking over a case, or when a patient is transferred from the intensive care unit. No anesthesia provider can simply accept the word of another person that an endotracheal tube is in place. Verification by multiple means must occur, and it is often quite easy. Direct observation of the tube passing through the vocal cords, palpation of the tube as it passes into the trachea, and condensation in the endotracheal tube all help confirm proper placement. Auscultation over the lungs for breath sounds and over the stomach for silence confirms placement. Observation of the patient for chest rise and lack of abdominal distension along with lack of cyanosis helps to confirm placement. Patient monitors will detect expired CO₂ and oxygen saturations will be maintained. All these factors are quickly assessed in normal situations.

The possibility of bronchospasm, as raised by Dr B, makes the diagnosis of correct endotracheal intubation much more problematic. Anesthesiologists commonly deal with patients with reactive airways [1], and pediatric anesthesiologists deal with this disease entity multiple times over the course of a day in the operating room. There is a broad spectrum of disease, and it is often not so severe as to dramatically change the management of most patients. Bronchospasm may, however, be so severe that there is no effective ventilation; breath sounds will not be audible and the chest will not rise [2]. In cases as severe as this, the capnograph will reflect the clinical situation. Without ventilation, no exhaled CO₂ can be detected. Several reports of proper intubation in the face of no confirmatory capnography have been published [3-5]. End-tidal CO₂ may not be detected either in cases of deep endobronchial intubation or decreased cardiac output states.

In the face of severe bronchospasm, the anesthesiologist has fewer options to immediately verify placement of the endotracheal tube. One must rely on the word of the person performing the intubation, the absence of sounds over the abdomen, and, in some cases, the maintenance of oxygen saturation. Patient history and high airway pressures will aid in the diagnosis of bronchospasm. Other methods such as confirmation with a fiber-optic bronchoscope [6] or chest radiograph are also valid options, but take somewhat longer. Although H's oxygen saturation was low, the facts of the case state that it actually rose to the 70s after Dr W's attempted intubation and then leveled off. An increase in saturation would indicate that some ventilation and oxygenation were occurring, even in the face of no end-tidal CO₂. Although the word of an otolaryngologist that he "is in" is not final, it

carries more weight than that of someone with less experienced hands. Given the facts of the case as stated it seems that Dr B made the best decisions she could with the information she had. She did not depend solely on the word of Dr W, but used his assessment in conjunction with her assessment of the patient's condition. H's increasing oxygen saturations led her to believe that Dr W had successfully intubated H.

Looking back is easier than being in the middle of the crisis, but there are several medical details of the case that would be enlightening. More of H's medical history, specifically a history of asthma or respiratory infection, would be supportive of the diagnosis of intraoperative bronchospasm. The documentation of such factors as the presence or absence of sounds over the stomach, abdominal distension with continued attempts at ventilation, the ventilating pressures used by the anesthesia team during attempts at ventilation, the relative ease or difficulty of mask ventilation, and other treatments undertaken for H's bronchospasm, would further clarify the course of events and the decision making.

We must trust and we must also verify. Trusting the opinions and diagnoses of others is a necessity in the practice of medicine. We trust a cardiologist's interpretation of an echocardiogram, we trust the surgeon's ability to skillfully remove a tumor without excessive blood loss, and we trust our drug vials to be what they are labeled. We must always be ready for any possibility, so we use our judgment and monitor for cardiac ischemia, we place one more IV, and we watch for appropriate drug effects. It is the ultimate responsibility of the anesthesiologist to ensure the correct placement of the endotracheal tube, but this case was difficult for several reasons. The airway was known to be challenging. The trust was given to an otolaryngologist, a surgeon who is a colleague in airway management and a trusted backup in difficult situations. The possibility of bronchospasm complicated the customary methods of confirmation of tube placement, and the increase in oxygen saturations confused the clinical picture. Dr B treated patient H with her best judgment for bronchospasm. After her therapy did not have the desired response, she reassessed the situation, changed plans, attempted visual confirmation, and ultimately replaced the incorrectly placed tube.

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