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FEATURES

Ultrasound Guidance at the Point of Care

This practice lets health systems and accountable care organizations improve patient safety and cuts costs.

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Posted on: March 21, 2011

As we move forward into an era of increased healthcare system accountability, the key question hospital administrators face is how to reduce costs and still maintain stringent safety standards.

Despite a few recent volleys from radiologists in their longstanding turf war with non-radiologists, within the wider healthcare community the focus has shifted to efficient, appropriate use of ultrasound at the point of care across medical specialties. Robust evidence from multiple studies demonstrates that using this technology at the patient's bedside delivers proven value by improving patient care and safety at a fraction of the cost of such advanced imaging technologies as computed tomography and magnetic resonance imaging.

As an emergency medicine physician, I vividly recall the first time I used ultrasound at the bedside, in 1993, in the critical resuscitation area of the busy Los Angeles trauma center. At that time, I could "magically" see below the skin and recognize internal bleeding inside the abdomen of a car accident victim, who was then immediately sent to the operating room for emergency surgery. Without bedside ultrasound diagnostics, that patient would have died.

This is a story that now happens around the country on a daily basis as emergency physicians experience these sentinel "a-ha" moments when an expected or unexpected finding from ultrasound at the point of care dramatically changes the course of treatment.

Raising Efficiency, Reducing Risks

In February, a New England Journal of Medicine review reported that appropriate use of ultrasound at the point of care can "decrease medical errors, provide more efficient real-time diagnosis, and supplement or replace more advanced imaging in appropriate situations."[1] Use of CT scans has grown rapidly since 2000, raising public health concerns about the cumulative risks of lifetime radiation load, especially for children and young adults. In certain clinical scenarios, such as evaluating patients with recurrent conditions like kidney stones, ultrasound can offer an appropriate and less expensive care pathway that also avoids the radiation load associated with serial non-contrast CT.

There is also a growing recognition of the importance of having one standard of care across hospital departments and medical specialties, so that procedures are consistently performed according to the same top-level safety protocols, whether the patient is treated in the emergency department, the critical care unit or the operating room. Compared to landmark-based techniques for vascular access - essentially a blind approach in which the physician estimates where the blood vessel lies below the skin - ultrasound guidance can powerfully increase both the safety and first-pass success of needle-based procedures.

In fact, for central venous access, the evidence is so overwhelming that the Agency for Healthcare Research and Quality ranks ultrasound guidance as one of the most important safety practices to prevent patient injuries and serious procedural complications.[2] Many leading hospitals across the nation have now adopted ultrasound-guided needle tracking as a "best practice," mandating its use for all central line insertions. Cutting-edge medical schools, such as the University of California, Irvine, are now training students how to use ultrasound visualization at the point of care, to see vessels, now ranking this as a core skill for tomorrow's physicians.

Financial Benefits of Ultrasound Guidance

Are ultrasound-guided needle insertions more cost-effective than blind insertions? Until recently, the answer was unclear, due to lack of hard evidence. Now, a new study is the first to quantify costs and adverse events associated with two commonly performed invasive procedures: thoracentesis and paracentesis.[3]

In an unpublished study to be presented in May at the National Patient Safety Forum in Washington, DC, researchers from United BioSource Corporation's Center for Epidemiology and Database Analytics used the national Premier Perspective automated hospitalization claims database to compare outcomes in a cohort of patients who underwent these procedures between January 2007 and December 2008.

For the 61,261 patients included in the analysis who underwent a thoracentesis, ultrasound guidance reduced the incidence of pneumothorax by 19 percent. When a pneumothorax occurred, this complication increased a patient's hospital cost to $13,784, compared to $11,032 for a patient who didn't suffer a collapsed lung. In addition, mean length of hospital stay was 7.9 days for a patient with a pneumothorax, versus 6.5 days for a patient without it.

For the 69,859 patients who underwent a paracentesis - a particularly tricky procedure to perform in a blind fashion - suffering a bleeding complication boosted hospital costs to nearly $30,000, about triple the costs for patients without a complication ($9,476) and length of hospital stay was doubled, from a mean of 3.1 days for a patient without a bleeding complication to a mean of 6.2 days for a patient with one.

Preventing Million-Dollar Mistakes

Increased hospital costs and longer patient stays aren't the only potential financial consequences if needle-based procedures are performed without ultrasound guidance. Medical errors resulting from traditional blind techniques can lead to expensive lawsuits.

When the American Society of Anesthesiologists analyzed 7,328 closed malpractice claims, the researchers reported that, "claims related to central catheters had a high severity of patient injury."[4] For pneumothorax, the median payment was $143,250 and for cardiac tamponade, payment ranged from $34,449 all the way up to $6.9 million. Payments exceeding $1.4 million were reported for hemothorax and above $1.7 million for blood vessel injury. Overall, the median malpractice payment for all central venous catheter-related claims combined was $105,500.

As we strive to improve America's healthcare, administrators should carefully weigh the safety, efficiency and potential for reducing or avoiding costs by employing the same high standards of care throughout the hospital. Not only is there compelling new evidence that ultrasound at the point of care is an ideal technology to help physicians practice better medicine at lower cost, but ultrasound now has a major role outside of radiology to enhance patient experience and safety. It is clear that ultrasound at the point of care is an ideal best practice within today's health systems and tomorrow's accountable care organizations.

If you or a family member were ill, would you want your physician performing invasive procedures on your chest, abdomen or neck without ultrasound guidance? That would be like an airplane pilot flying without radar at night, hardly the safest way to reach the right destination. Any move to reduce access to ultrasound at the point of care, either by turf-related politics, regulatory barriers or reimbursement changes, could compromise patient safety and care, forcing physicians to once again fly blind.

References

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