There are several more robust ways to confirm success. Fluoroscopy has already shown to be one of the best predictors of exact epidural catheter placement. It also has the added advantage of lowering failure rate and almost eliminating dislodgements completely. However, the investment in equipment, training, radiological protection and interpretation of imaging has hindered any broad implementation.

Waveform analysis¹² can either be used with an auditive sound adapter, which requires a specific device.¹² In addition, it can be used by placing a pressure transducer on the epidural needle and examining the presence of a pulsatile pressure wave.

Tsui test¹³ or epidural electrical stimulation test (EST) is in my humble opinion the best way to detect perfect positioning of the catheter.¹³ However, it is very underutilized, probably due to poor understanding and lack of availability of a 'Johans Adapter' (figure 1).



Abstract SP17 Figure 1 Johans Adapter

Other devices and future developments like bioimpedance or optical reflectance spectroscopy may still impact the way we place thoracic epidurals, however fall beyond the scope of this lecture.

Conclusion HTEA is a very effective anesthetic technique which should be <u>reserved</u> for major surgery and <u>preserved</u> for future generations. The training of this approach is progressively more difficult with ever decreasing numbers. Online resources, ultrasound and simulators should be implemented to reach proficiency. Clinical pearls, optimal caseload and training by experts is the best way to go. More research is needed in tools like special syringes and waveform analysis devices to analyze their usefulness. The Tsui test is the ultimate practical test to evaluate successful catheter placement.

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SP18 POCUS: PICK THE LIT. WELL AND LESS WELL STUDIES FROM THE SCENE

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Introduction Research regarding Point of care ultrasound (POCUS) has been steadily growing since its introduction in critical care and emergency medicine more than a decade ago. It encompasses a whole array of skills targeting specific organs like the heart, lungs, airway and evaluating a patient's functional status using the ultrasound (US). Exactly these broad applications and myriad of possibilities have made POCUS very intimidating for the novice. It is beyond the scope of this lecture and abstract to focus on all these aspects. Instead, we will try to refresh the general knowledge and give our top picks of POCUS literature, while pointing out a few pitfalls and shortcomings in literature and training.

Discussion

General The most influential POCUS articles for regional anesthesiologists are the two special articles by a joint panel of regional anesthesiologists and pain specialists. 'American Society of Regional Anesthesia (ASRA) and Pain Medicine expert panel recommendations on point-of-care ultrasound education and training for regional anesthesiologists and pain physicians-part I and II'1,2 Haskins et al. wrote a series of recommendations after a thorough literature research. What is particularly ingenious in these thoroughly fascinating papers is the links they make to regional anesthesia. Cardiac POCUS immediately becomes more interesting for a locoregional specialist, when it's examined from a local anesthetic toxicity evaluation (LAST) perspective. Or when it's implemented for a decision for a hip fracture spinal after evaluation of aortic valve stenosis. The extensive recommendations, clear images and sheer number of references signifies its importance. Part two focuses on a problem we already previously hinted at. The countless possibilities POCUS offers, makes training and gaining proficiency exceedingly harrowing. The joint ASRA/pain panel tries to define minimum training recommendations and should be considered as the reference when setting up a POCUS skill program anywhere. It is exactly this educational advice which we as authors perceive to be extremely important in this paper. POCUS has been mostly sidetracked by inadequate exposure and failure to implement minimum standards in èresidency. These two excellent publications are a sheer treasure trove of information and should be the top pick of any regional specialist reading list.

Specific The most important general POCUS skill for anesthesiologists will arguably be the evaluation of gastric content and volume. Our top picks here would be 'Validation of a mathematical model for ultrasound assessment of gastric volume by gastroscopic examination' which is a brilliant Randomized Controlled Trial (RCT) refining the idea of calculating gastric fluid volume by Perlas et al. We consider it an invaluable article providing easy to use formulas with practical implications for clinical decision making. The systematic review by Van de Putte et al. published in the British Journal of Anaesthesia: 'Ultrasound assessment of gastric content and volume' is a must read for everybody who wants to excel at this key POCUS skill.^{3,4} It presents a full understanding of the different formulas to calculate volume, while supplying all available evidence in a clear way.

POCUS of the airway is a fascinating aspect of the possibilities US offers us. Being able to quickly assess an esophageal intubation with the double track sign might be more helpful for the novice in airway management. However, the possibility to reliably identify the cricothyroid membrane even in morbid obese patients is immensely helpful for anesthesiologists. Kristensen et al. have published quite a few interesting papers regarding this topic.^{5,6}

Although lung US scanning might not be the most practiced skill for regional focused anesthesiologists, the ability to quickly assess (with high accuracy) a pneumothorax is invaluable, especially when performing infra and supraclavicular blocks. No Lung POCUS overview would be complete without mentioning the plethora of papers published by Daniel A Lichtenstein. His most influential papers revolved around the implementation of the so-called 'BLUE protocol' and respiratory failure.⁷ However it is 'A Bedside Ultrasound Sign Ruling Out Pneumothorax in the Critically III', as one of the first papers detailing lung sliding and analyzing the specificity and sensitivity of the US that really captures our heart.⁸ Incredibly this RCT was already published back in 1995 and has more than 500 citations.

Finally, a recent study with a catchy title: 'Not so FAST -Chest ultrasound underdiagnoses traumatic pneumothorax' would be our only pick in the less well studies category.⁹ It clearly shows the dangers of retrospective, monocenter studies presenting vastly conflicting results. Diagnostic accuracy studies should follow STARD guidelines, while in this publication only patients with confirmed pneumothorax were included in the study, instead of all patients with suspected pneumothorax. ¹⁰ Furthermore, the study was performed by radiologists, not familiar with the specifics of trauma pneumothorax identification. They also incorporated it in the Focused assessment with sonography (FAST) exam, using a phased array or curvilinear probe which is not suitable for proper pneumothorax detection.

Although there are still many topics in POCUS left, like FAST, eFAST, volume status ascertainment, or even venous access to name but a few, it is well beyond the framework of our small overview to elaborate further.

Conclusion POCUS is here to stay and has become the gold standard as a diagnostic tool in only a few years. Ultrasounds have become ubiquitous, making its routine use feasible. The dazzling number of possible applications can be daunting for the novice, however online training resources are readily available for everyone. Lack of teaching and training in standard curriculum remains a serious stumbling block.

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SP19 RELEVANCE OF CUTANEOUS NERVE BLOCKS

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In the case of regional anaesthesia for surgery in the awake patient, it is evident that every sensory nerve in the surgical field, including cutaneous nerves, must be anesthetised to obtain a satisfactory procedure. However, for postoperative analgesia, after general anaesthesia, selective nerve blocks of cutaneous nerves are less commonly performed or added to conventional nerve blocks in order to provide a more complete analgesia when needed. The lack of exhaustive knowledge of the neural anatomy, that still exists for certain areas of the human body, can be one explanation. The inability, logistically, to perform more nerve blocks or more complex nerve blocks could be another. Nevertheless, the notion that pain from cutaneous nerves is neglectable, and that wound infiltration by the surgeon would satisfactorily provide equal analgesia is not uncommon.

Scientific studies, comparing wound infiltration by the surgeon to any selective cutaneous nerve block, are absent. There are multiple studies comparing standard nerve blocks of mixed nerves to wound infiltration finding superior analgesia after nerve blocks.¹⁻⁴ However, the relative importance of the cutaneous nerves cannot be extracted from these studies. Experiencing, not infrequently, the analgesic effect of providing cutaneous rescue blocks for failed surgical infiltration may also prove nothing more than improper infiltration technique. Nonetheless, if adequate anaesthesia of every cutaneous nerve ending in the surgical field by infiltration is regularly a challenging task, then this clinical reality should be the relevant comparator. Despite the lack of direct comparison between cutaneous nerve blocks and wound infiltration, the comparably much longer effect of nerve blocks compared to infiltration³ could alone favour the former in many cases.