Critical Review Form

Meta-analysis

Spinal epidural abscess: a meta-analysis of 915 patients, Neurosurg Rev 2000; 232:175-204

Objective: **"To offer detailed evaluation and comprehensive meta-analysis of the international literature on SEA between 1954 and 1997, especially of patients who developed it following anesthetic procedures in the spinal canal." (p. 175)**

Methods: **The authors do not provide any methods for this meta-analysis which essentially makes it a narrative review not a systematic review or meta-analysis. All meta-analyses are systematic reviews, but not all systematic reviews are meta-analysis. A meta-analysis involves summing the results of similar studies to yield summary point estimates with narrower confidence intervals. A systematic review always has the following characteristics:**

1. **A single, well-defined question.**
2. **A reproducible search strategy (how the evidence was located)**
3. **Manuscript inclusion/exclusion criteria and explicitly stated personnel who read abstracts/manuscripts before determining each potential article's disposition.**
4. **An assessment for individual article methodological quality using a validated metric.**
5. **Evaluation for publication bias.**
6. **Statistical test for heterogeneity.**

Only if each of these steps have been taken (see PRISMA) and similarly designed studies (patients recruited at same stage of disease, same criterion standard applied to establish diagnosis, similar spectrum of co-morbidities, equitable therapeutic management post-diagnosis, etc) and no statistically significant heterogeneity is identified, can meaningful meta-analysis be conducted. Since these authors follow none of these steps this is a narrative review not a meta-analysis and GI=GO.

Guide	Question	Comments
I	***Are the results valid?***	
1.	Did the review explicitly address a sensible question?	No single question is broached. Instead this is written as a thesaurus of SEA case series.
2.	Was the search for relevant studies details and exhaustive?	No explicit search strategy or test for publication bias is described.
3.	Were the primary studies of high methodological quality?	No assessment of methodological quality is reported.
4.	Were the assessments of the included studies reproducible?	There was no assessment reported so the reader is left uncertain whether they would find or select the same manuscripts or abstract and interpret the same results.
II.	***What are the results?***	
1.	What are the overall results of the study?	• The incidence of SEA is 0.2-2 cases per 10000 hospital admissions or less than 1 case per million residents, but due to an aging society, higher prevalence of DM, and increased use of spinal instrumentation (LP, spinal anesthesia, surgical hardware) to incidence of SEA is projected to increase in coming decades. • Most cases of SEA occur after the age of 30-years with a male: female ration of 1=0.56. • Risk factors have the following sensitivities: DM (15%), IVDA (9%), alcohol abuse (5%), cutaneous infections (abscess, furuncle) (15%), extra spinal or spinal trauma (10%), degenerative vertebral disease (6%), chronic renal insufficiency (2%), cancer (2%), epidural anesthesia (5%), other invasive procedures (22%), vascular access (2%). Other risk factors that are not quantified include pregnancy and IBD. • Most SEA occur at thoracic (3%) or lumbosacral (30%) level.

		Sensitivity of signs/symptoms: Back pain 71% Fever 66% Local tenderness 17% Spinal irritation 20% Muscle weakness ⊛ 26% Incontinence ⊛ 24% Sensory deficit ⊛ 13% Paraplegia 31% Neck pain 3% Headache 3% Tetraplegia 3% Irritability 1% ⊛Initial neurological deficit. • Average WBC 15.7 and average ESR 77 with 94% SEA patients >20. • Most common misdiagnoses were meningitis and herniated disc. • Staphylococcus aureus causative organism in 73%, but gram-negatives more common etiology (not most common) in IVDA. • X-rays only demonstrate diagnostic findings in 23-37%. • The sensitivity of MRI is 91% vs. 92% for myelo-CT (Ref 154). • SEA mortality has remained constant since 1980: 15%. • The portion of SEA patients with full recovery is unchanged from 41-47% since 1971, whole 15% have residual paresis. • The duration of neuro abnormalities influence outcomes – no patient with paralysis developing >48º before surgical decompression demonstrate recovery.
2.	How precise are the results?	No 95% CI are reported and heterogeneous observational triads demonstrate wide-ranging point estimates.
3.	Were the results similar from study to study?	No. Triads ranging from the 1960's to late 1990's used a variety of diagnostic testing strategies, management protocols, and patient populations in evaluating different objectives in poorly described observational or retrospective trials.

III.	***Will the results help me in caring for my patients?***	
1.	How can I best interpret the results to apply them to the care of my patients?	The key strategy to optimize SEA outcomes is initially suspecting the diagnosis early, before neurological symptoms manifest. Since the diagnostic accuracy of history and physical exams (LR's) are unknown, this means clinicians must have a low threshold at which to order MRI's. Unfortunately, since back pain is a common musculoskeletal complaint and SEA is a fortunately rare diagnosis, many pack pain patients will have negative MRI's to identify the rare SEA patient.
2.	Were all patient important outcomes considered?	Yes. Death, permanent neuro deficits.
3.	Are the benefits worth the costs and potential risks?	Uncertain. No cost benefit analysis is hypothesized.

Limitations:

1. No a meta-analysis. This is a lengthy, well referenced narrative review.
2. No contemplation of cost benefit analysis or test treatment thresholds.

Bottom Line:

SEA is a rare disease that most commonly presents with back pain and fever, but the diagnostic accuracy (Sen, Spec, LR's) of history, physical exam, routine labs, and imaging studies is unknown because all of the literature is case-series which do not evaluate disease-negative subjects. In addition to assessing a consecutive sampling of SEA-positive and SEA-negative patients using STARD criteria to establish diagnostic accuracy, future trials, ??? establish cost-effective diagnostic strategies, perhaps in the ???????????