Diagnosis

2.1. DIAGNOSIS: GENERAL PRINCIPLES

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QUESTION 1: What is the definition of surgical site infection (SSI) in spinal surgery?

RECOMMENDATION: We recommend utilizing the definition provided by the Centers for Disease Control and Prevention (CDC), National Healthcare Safety Network (NHSN) Patient Safety Component Manual, Chapter 9: Surgical Site Infection (SSI) Event.

LEVEL OF EVIDENCE: Consensus

DELEGATE VOTE: Agree: 100%, Disagree: 0%, Abstain: 0% (Unanimous, Strongest Consensus)

RATIONALE

The most persuasive argument for adopting the CDC's definition for an SSI lies in utilizing search protocols to map International Classification of Disease, 10th revision, Procedure Classification System (ICD-10-PCS) and Current Procedural Terminology (CPT) codes when querying databases.

The CDC definition is the accumulation of multiple years of planning/tracking and modifying this instrument via annual reviews and input from professionals worldwide. The description includes such categorical sub-elements as the definition of an operative procedure and the definition of an operating room. It includes criteria for the sub-classifications of a superficial incisional SSI, deep incisional SSI and organ/space SSI [1]. The CDC's definition delineates the exclusion of such events as cellulitis, stitch abscesses, as well as stab wound or pin site infections. It also defines such infections about primary or secondary wounds and the surveillance periods for SSI following operative procedures. Furthermore, numerous spine-related studies have utilized the same definition put forth by the CDC [2–5].

Adopting a thorough and uniform definition for SSI is imperative, as studies have shown that the rate of SSI following spine surgery varies based on the definition used [6]. In addition, having a standardized definition will improve surveillance, provide consistency among studies and improve overall patient care.

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QUESTION 2: What defines delay in the diagnosis of a spine infection?

RECOMMENDATION: There is no clear or established definition of delayed diagnosis for spine infection.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 100%, Disagree: 0%, Abstain: 0% (Unanimous, Strongest Consensus)

RATIONALE

The diagnosis of spinal infections is often delayed from one to three months from the onset of symptoms [1,2]. Delay in diagnosis is frequently secondary to nonspecific symptoms including back and neck pain. A couple of studies have used delayed diagnosis

of greater than eight weeks as a predictor of lower recovery rates, neurologic deficits and long-term disability [2–4]. A recent study by Issa et al. demonstrated that the percent of positive cultures from blood and/or biopsy decreases as the delay in diagnosis increases [2–5].

Jean et al. looked at predictors of delayed diagnosis and found that X-rays resulted in an increased delay from 14 days to 34.7 days [6]. It is presumed that, although delaying diagnosis, X-ray findings (either normal or demonstrating degenerative changes) provide the physician with reassurance. Alternatively, Jean et al. found that fever at initial presentation, elevated C-reactive protein (CRP) and blood cultures shortened the time to diagnosis [6]. The most significant impact was the elevated CRP which shortened the diagnostic delay from 73 days to 17 days [6]. It is therefore suggested that CRP be routinely checked in cases of new onset or sudden increased back pain [6,7]. Furthermore, if CRP is elevated or if there is clinical suspicion for spine infection, MRI with gadolinium should be performed [8].

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QUESTION 3: Is there an optimal window for diagnosis of an early spine infection?

RECOMMENDATION: There is no defined window, but early diagnosis of a postoperative spine infection (up to three months from time of surgery) treated with surgical debridement and antibiotics often allows for retention of instrumentation.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 93%, Disagree: 7%, Abstain: 0% (Super Majority, Strong Consensus)

RATIONALE

Although the evidence regarding this topic is from low-quality studies, the findings and recommendations are consistent. Most postoperative spinal infections in adults present early, typically within the first three months [1]. Early diagnosis and debridement typically allows for retention of implants when present [1]. Implant removal due to infection can result in satisfactory results and eradicate infection, but can lead to malalignment and pseudarthrosis [2].

Early spine infections (< three months after surgery) treated with irrigation and debridement have improved outcomes compared to before surgery, but cause increased back pain and a lower probability of achieving a minimal clinically important difference [3].

In a cohort study of 51 patients who developed a postoperative spinal implant infection, prompt treatment (< 3 months) with debridement allowed for implant preservation in 41 patients, versus 10 patients in which treatment was delayed and implants were removed [4]. Another case series identified 26 postoperative infections, of which 24 were able to be treated without removal of implants by aggressive debridement and secondary closure [5]. Early identification and treatment can often allow for implant retention compared to delayed presentation, when implants may need to be removed [6–8].

Late spine infections are, however, seen more commonly in idiopathic scoliosis cases [9]. In a case-controlled series of 236 patients, seven developed an infection [10]. One was early and the other six were diagnosed at an average of 34.2 months postoperatively.

It is typical for patients to have symptoms of low back pain for 4 to 10 weeks prior to diagnosis of spondylodiscitis [11,12]. Although most studies recommend early treatment, no specific timeframe could be identified that definitely leads to better outcomes.

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