Open Access Journal of Surgery
ISSN: 2476-1346

Juniper Publishers
key to the Researchers

Mini Review
Volume 6 Issue 1 - September 2017
DOI: 10.19080/OAJS.2017.06.555679

Open Access J Surg

Guidelines for the Management of Pyogenic Spinal Infections: A Short Review

Vibhu Krishnan Viswanathan* and Surabhi Subramanian

Clinical Spine Fellow, Ohio State University, USA

Submission: September 18, 2017; **Published:** September 21, 2017

***Corresponding author**: Vibhu Krishnan Viswanathan, Clinical Spine Fellow, Ohio State University, Columbus, Ohio – 43202, USA, Tel: +16143023859; Email: drvibu007@gmail.com

Abstract

Spinal infections are major conditions, capable of posing significant risks to immunosuppressed population. These conditions can lead to potentially disastrous outcome, if timely treatment is not administered. The current article briefly reviews the guidelines in the clinical diagnosis and management of commonly encountered spine infections.

Introduction

Spinal infection was first described by Hippocrates and the management of infection of the vertebral column has greatly evolved over the ages [1]. The common infections involving the vertebral column include spondylodiscitis (infection of intervertebral disc), spondylitis (infection of vertebral body/ end plate) and epidural abscess [2,3]. The management of this complex problem is multimodal and includes antibiotics, surgical intervention and supportive treatment [2]. Literature reports suggest that a mean delay of 2-6 months is commonly encountered, which can lead to a catastrophic outcome in certain situations [4,5]. The current article highlights the guidelines in the management of pyogenic spinal infections and reviews the current literature on the same.

Discussion

The diagnosis of pyogenic spinal infections can be difficult and requires a high degree of suspicion [2,4]. Pain is the most common, early presentation (85%), while fever occurs in approximately 50%of patients [6,7]. Neurological deficits, as defined by symptoms including leg weakness, numbness or bladder/ bowel incontinence are observed in 33% of patients [8]. The diagnosis is usually based upon the clinical picture, supported by laboratory and imaging findings [2,4].

Spondylitis or Spondylodiscitis

Infections may spread to the vertebral body or disc through hematogenous seeding from a distance focus or a contiguous spread from adjacent tissues [9]. Most infections are monomicrobial, a majority (50%) of which are caused by *Staphylococcus aureus* [10,11].

Guidelines in the management of Spondylitis or Spondylodiscitis: Laboratory tests can be helpful in identifying spondylodiscitis. Leukocyte cells can be normal or increased. However, Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP) are raised in 80% of patients and can serve as reliable indicators to follow the response to treatment [12]. Blood cultures are known to be positive in 50-70% of patients [11]. The confirmatory test is histopathological examination of the infected vertebra or disc space. Nevertheless, in a setting of typical clinical and radiological findings suggestive of infection with a blood culture positive for a likely pathogen, biopsy may not be indicated [13,14].

In most situations, vertebral spondylodiscitis or spondylitis is not a medical emergency and therefore, antimicrobial therapy should not be administered until the microbiological diagnosis is complete with biopsy [13]. The empirical administration of antimicrobial treatment is indicated only in situations of neurological compromise and sepsis [9]. Image (usually Computed Tomography or CT) guided needle biopsy of the affected bone and disc space; and abscess aspiration to obtain aerobic/ anerobic bacterial, fungal and mycobacterial cultures; as well as histopathological examination are recommended [13]. Indications for surgery include neuro-deficits, epidural/ paravertebral abscesses, threatened or existing cord compression and progression, persistence or recurrence of infection despite antibiotic treatment [9,10].

In case of a negative initial culture despite high clinical suspicion,repeat biopsy is advocated. If the biopsy is still inconclusive, empirical antibiotics may be initiated. However,

a third percutaneous or an open surgical biopsy needs to be planned if there is no objective clinical improvement in 3 to 4 weeks [15]. Another school of thought is to plan an open surgical biopsy after an inconclusive first set of cultures, prior to starting antibiotic treatment [10]. There are no current randomized controlled studies on the ideal pathogen-directed chemotherapy. Nafcillin, oxacillin or cefazolin for methicillin-sensitive *Staphylococcus aureus* (MSSA), vancomycin for methicillin-resistant *Staphylococcus aureus* (MRSA), ceftriaxone or penicillin G for Streptococcal species and 3rd- or 4th generation cephalosporins or fluroroquinolones for gram negative bacteria are typically recommended [16].

The empirical antibiotics include a combination of vancomycin with cefotaxime/ ceftazidime/ ceftriaxone/ cefepime or ciprofloxacin. No routine coverage for anerobic organisms is advocated [16]. No routine radiologic follow-up is advised during anti-microbial therapy [17]. Only when the clinical status has not improved despite medical treatment, Magnetic Resonance Imaging (MRI) scan can be obtained to evaluate the need for surgical treatment [17]. MRI scan may be procured 4 to 8 weeks after the completion of treatment [18]. The typical duration of therapy recommended is 6 weeks (parenteral antibiotics), although longer treatment may be indicated in persistent abscesses, drug-resistant organisms and extensive bone destruction [19].

Epidural Abscess

The classic diagnostic triad for epidural abscess includes fever, spinal pain and neuro-deficit, which is typically observed only in a small proportion of patients [20].

Guidelines in the management of Epidural Abscess: Cultures obtained from 90% of abscess 62% of blood and 19% of cerebrospinal fluid (CSF) specimen show positive growth [21]. Two sets of blood cultures and CT guided needle biopsy are obtained in all patients [21]. Two major principles of optimal treatment in epidural abscesses include reduction in size or elimination of the epidural inflammatory mass (surgical drainage) and eradication of the microbe (antimicrobial treatment) [22]. Early surgical decompression and drainage is critical in determining the ultimate prognosis [23]. Indications for surgery include paralysis (within 24 to 36 hours of onset) and significant cord compression on imaging, even in the absence of any neuro-deficit [24].

Immediate administration of antibiotics is recommended after the collection of two sets of blood culture specimens are obtained, whenever the diagnosis of spinal epidural abscess (SEA) is suspected [25]. Although the consensus is heavily in favor of early surgery, there is currently no randomized controlled study comparing the outcome of medical treatment with surgical decompression in SEA [25]. The overall failure rates following conservative (medical-only treatment) approach has been reported to be around 43 to 75% [26]. Medical treatment includes antibiotic therapy under careful supervision, including regular neurological monitoring strategy and follow-up MRI scan [27].

This modality of treatment is only advocated in a small percentage of patients, including those without any known high-risk factors predictive of poor outcome (age more than 65 years, diabetes mellitus, CRP>115 mg/liter, white blood cell count more than 12, 500 cells/ liter, bacteremia and MRSA infection), known organism on culture, no neuro-deficit, medically unstable patients, unacceptable surgical risks and complete spinal cord injury more than 48 hours and lack of evidence of ascending spinal lesion [28]. Even among this highly selected group of "ideal" patients, the risk of failure of isolated medical therapy in SEA is as high as 8.5 to 17 percent [29]. The recommended duration of antimicrobial treatment in SEA is 4 to 8 weeks and first follow-up MRI scan may be obtained after 4 to 6 weeks, if the patient shows satisfactory clinical improvement or at any time whenever a clinical deterioration happens [30]. The prognosis following SEA is guarded, with 5% deaths (due to sepsis) and 4-22% irreversible neuro-deficit reported following treatment [31].

Conclusion

Spinal pyogenic infections are important pathologies, with potentially catastrophic outcome. The need for high alert on part of the spine specialist, early diagnosis, prompt treatment (medical or surgical, as indicated) and regular follow-up cannot be understated, so as to ensure a good recovery.

References

1. Bhat S, Kangoo KA, Zahoor A, Nazir A (2015) Concomitant Pyogenic Spondylodiscitis with Large Psoas Abcess in Known Case of Tuberculosis Spine; Presenting as Refractory Tuberculosis. J Spine 4: 212.
2. Frangen TM (2006) Surgical management of spondylodiscitis. An analysis of 78 cases. Unfallchirurg 109(9): 743-753.
3. Sobottke R (2008) Current diagnosis and treatment of spondylodiscitis. Dtsch Arztebl Int 105(10): 181-187.
4. Butler JS (2006) Nontuberculous pyogenic spinal infection in adults: a 12-year experience from a tertiary referral center. Spine (Phila Pa 1976) 31(23): 2695-2700.
5. Tsiodras S, Falagas ME (2006) Clinical assessment and medical treatment of spine infections. Clin Orthop Relat Res 444: 38-50.
6. Fantoni M (2012) Epidemiological and clinical features of pyogenic spondylodiscitis. Eur Rev Med Pharmacol Sci 16(Suppl 2): 2-7 13.
7. Jensen AG (1997) Increasing frequency of vertebral osteomyelitis following Staphylococcus aureus bacteraemia in Denmark 1980-1990. J Infect 34(2): 113-118.
8. Mylona E (2009) Pyogenic vertebral osteomyelitis: a systematic review of clinical characteristics. Semin Arthritis Rheum 39(1): 10-17.
9. Berbari EF, Kanj SS, Kowalski TJ (2015) Infectious Diseases Society of America (IDSA) Clinical Practice Guidelines for the Diagnosis and Treatment of Native Vertebral Osteomyelitis in Adults. Clin Infect Dis 61: 26.
10. Lew DP, Waldvogel FA (2004) Osteomyelitis. Lancet 364: 369.

How to cite this article: Vibhu K V, Surabhi S. Guidelines for the Management of Pyogenic Spinal Infections: A Short Review. Open Access J Surg. 2017; 6(1): 555679. DOI: 10.19080/OAJS.2017.06.555679.

11. Nolla JM, Ariza J, Gómez-Vaquero C (2002) Spontaneous pyogenic vertebral osteomyelitis in nondrug users. Semin Arthritis Rheum 31: 271.

12. Beronius M, Bergman B, Andersson R (2001) Vertebral osteomyelitis in Göteborg, Sweden: a retrospective study of patients during 1990-95. Scand J Infect Dis 33: 527.

13. Marschall J, Bhavan KP, Olsen MA (2011) The impact of prebiopsy antibiotics on pathogen recovery in hematogenous vertebral osteomyelitis. Clin Infect Dis 52: 867.

14. Chang CY, Simeone FJ, Nelson SB (2015) Is Biopsying the Paravertebral Soft Tissue as Effective as Biopsying the Disk or Vertebral Endplate? 10-Year Retrospective Review of CT-Guided Biopsy of Diskitis Osteomyelitis. AJR Am J Roentgenol 205: 123.

15. Gras G, Buzele R, Parienti JJ (2014) Microbiological diagnosis of vertebral osteomyelitis: relevance of second percutaneous biopsy following initial negative biopsy and limited yield of post-biopsy blood cultures. Eur J Clin Microbiol Infect Dis 33: 371.

16. Duarte RM, Vaccaro AR (2013) Spinal infection: state of the art and management algorithm. Eur Spine J.

17. Carragee EJ (1997) The clinical use of magnetic resonance imaging in pyogenic vertebral osteomyelitis. Spine (Phila Pa 1976) 22: 780.

18. Kowalski TJ, Berbari EF, Huddleston PM (2006) Do follow-up imaging examinations provide useful prognostic information in patients with spine infection? Clin Infect Dis 43: 172.

19. Bernard L, Dinh A, Ghout I (2015) Antibiotic treatment for 6 weeks versus 12 weeks in patients with pyogenic vertebral osteomyelitis: an open-label, non-inferiority, randomised, controlled trial. Lancet 385: 875.

20. Chen WC, Wang JL, Wang JT (2008) Spinal epidural abscess due to Staphylococcus aureus: clinical manifestations and outcomes. J Microbiol Immunol Infect 41: 215.

21. Gellin BG, Weingarten K, Gamache FW (1997) Epidural Abscess. In: Infections of the Central Nervous S ystem, 2nd Edn, Scheld WM, Whitley RJ, Durack DT (Eds), Lippincott-Raven Publishers, Philadelphia, USA, pp 507.

22. Rigamonti D, Liem L, Wolf AL (1994) Epidural abscess in the cervical spine. Mt Sinai J Med 61: 357.

23. LiemLK, Rigamonti D, Wolf AL (1994) Thoracic epidural abscess. J Spinal Disord 7: 449.

24. Darouiche RO (2006) Spinal epidural abscess. N Engl J Med 355: 2012.

25. Mooney RP, Hockberger RS (1987) Spinal epidural abscess: a rapidly progressive disease. Ann Emerg Med 16: 1168.

26. Davis DP, Wold RM, Patel RJ (2004) The clinical presentation and impact of diagnostic delays on emergency department patients with spinal epidural abscess. J Emerg Med 26: 285.

27. Phillips JM, Stedeford JC, Hartsilver E, Roberts C (2002) Epidural abscess complicating insertion of epidural catheters. Br J Anaesth 89: 778.

28. Kim SD, Melikian R, Ju KL (2014) Independent predictors of failure of nonoperative management of spinal epidural abscesses. Spine J 14: 1673-1679.

29. Alton TB, Patel AR, Bransford RJ (2015) Is there a difference in neurologic outcome in medical versus early operative management of cervical epidural abscesses? Spine J 15: 10.

30. Pfister H-W, Klein M, Tunkel AR, Scheld WM (2014) Epidural abscess. In: Infections of the Central Nervous System, 4th Edn, Scheld WM, Whitley RJ, Marra CM (Eds), Wolters Kluwer Health, Philadelphia, USA, pp 550.

31. Danner RL, Hartman BJ (1987) Update on spinal epidural abscess: 35 cases and review of the literature. Rev Infect Dis 9: 265.

DOI: 10.19080/OAJS.2017.06.555679

How to cite this article: Vibhu K V, Surabhi S. Guidelines for the Management of Pyogenic Spinal Infections: A Short Review. Open Access J Surg. 2017; 6(1): 555679. DOI: 10.19080/OAJS.2017.06.555679.