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Retrospective Evaluation of Spontaneous Pyogenic Sponydylodiscitis Cases Hospitalized in Our Clinic

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ABSTRACT:

Retrospective evaluation of spontaneous pyogenic sponydylodiscitis cases hospitalized in our clinic

Objective: Spondylodiscitis is the infection of the intervertebral disc and the adjacent vertebral bodies. Pyogenic Spondylodiscitis often develops following spinal surgery, spontaneous pyogenic spondylodiscitis is rare. Delay in diagnosis due to the absence of specific findings may lead to high morbidity and mortality. In this case series, we aimed to evaluate clinical features, predisposing factors, treatment and results of patients with spontaneous spondylodiscitis followed at our clinic within five years period.

Material and Method: Between 01.01.2007-31.12.2014, files of thirteen consecutive patients diagnosed with spontaneous pyogenic spondylodiscitis and hospitalized in our clinic were studied retrospectively. Diagnosis was based on clinical presentation, laboratory findings like increased white blood cell count, erythrocyte sedimentation rate, C-reactive protein as an evidence of inflammation and also blood or biopsy culture results and magnetic resonance imaging findings consistent with the diagnosis.

The demographic characteristics, history, predisposing factors, laboratory and radiological data, microorganism and treatment response of patients were evaluated.

Results: Among the patients eight were male and five female. Ages ranged between 19-87. (Mean: 61) All patients suffered from back pain. Nine patients had fever higher than 38°C, and eight patients had a nerve root compression. There were nine cases with diabetes mellitus, and three of these patients had uncontrolled diabetes mellitus. Three of the patients had end-stage renal disease undergoing dialysis. Duration of symptoms before establishing the diagnosis ranged between 15-180 days.

S. aureus was the most common isolated microorganism. All S. aureus isolates were methicillin-sensitive. One of our cases was accompanied by S. aureus meningitis. The affected areas in eight cases were thoracic and and in five cases lumbar vertebra. Treatment was cefazolin in seven patients with MSSA, cefepime in patients with concomitant meningitis and ampicillin sulbactam in one patient with renal failure. One of the cases with isolated Enterococcus spp was treated with ampicillin sulbactam and one with teicoplanin. Patients with isolated Klebsiella spp were treated with levofloxacin. Four patients underwent surgical drainage. All patients responded to treatment.

Conclusion: Spontaneous pyogenic spondylodiscitis is a rare disease. However, in all patients with acute or subacute back pain the diagnosis should be considered particularly in patients with diabetes mellitus or advanced age. Early diagnosis is essential for high cure rate with appropriate medical treatment and surgical intervention if needed.

Keywords: Discitis, pyogenic, spontaneous spondylodiscitis

ÖZET:

Kliniğimizde yatarak takip edilen spontan piyojenik spondilodiskit olgularının retrospektif değerlendirilmesi

Amaç: Spondilodiskit intervertebral diskin ve komşu vertebraların infeksiyonudur. Piyojenik spondilodiskit çoğunlukla spinal cerrahiyi takiben gelişir, spontan piyojenik spondilodiskit ise nadirdir. Spesifik bulguların yokluğu nedeni ile tanı gecikmesi yüksek morbidite ve mortaliteye yol açabilir. Bu olgu serisinde beş yıllık periyotta kliniğimizde takip edilen spontan piyojenik spondilodiskit olgularının klinik özellikleri, predispozan faktörler, tedavi ve sonuçların değerlendirilmesi amaçlandı.

Gereç ve Yöntem: 01.01.2007-31.12.2014 tarihleri arasında kliniğimizde takip edilen spontan piyojenik spondilodiskit tanılı ardışık on üç hastanın dosyası retrospektif incelendi. Tanı olguların klinik bulguları, inflamasyonun laboratuar bulguları olan beyaz küre sayısı, eritrosit sedimentasyon hızı, C-reaktif protein artışı, kan ya da biyopsi kültür sonuçları ve tanı ile uyumlu magnetik rezonans bulguları ile konuldu. Olguların demografik özellikleri, özgeçmişleri, predispozan faktörleri, laboratuar ve radyolojik veriler, üreyen mikroorganizmalar ve tedavi yanıtları değerlendirildi.

Bulgular: Değerlendirilen on üç hastanın sekizi erkek, beşi kadındı. Yaşları 19-87 arasındaydı. (ortalama: 61) Bütün hastalar bel ağrısı şikayeti ile başvurmuştu. Hastaların dokuzunda 38°C ve üzeri ateş, dört hastada duyu kaybı, dört hastada kas güçsüzlüğü olmak üzere sekizinde nörolojik bulgular vardı. Diyabetes mellitus olguların dokuzunda bulunmaktaydı, bu olguların üçünde ise diyabetes mellitus kontrolsüzdü. Olguların üçü son dönem böbrek yetmezliği olup dialize girmekteydi. Tanı öncesi semptom süresi 15-180 gün arasında değişmekteydi. En sık etken S.aureus olarak belirlendi. İzole edilen S. aureus tümünde metisiline hassastı. Olgularımızdan birinde S. aureus menenjiti eşlik etmekteydi. Etkilenen bölge sekiz olguda torakal, beş olguda lomber vertebraydı. Etkeni MSSA olan olguların yedisinde sefazolin iv ile, menenjit eşlik eden olguda sefepim, bir olguda ise böbrek yetmezliği nedeniyle ampisilin sulbaktam ile tedaviye başlandı. Etken olarak Enterococcus izole edilen olgulardan biri ampisilin sulbaktam, diğeri teikoplanin ile, Klebsiella spp izole edilen ise olgu levofloksasin ile tedavi edildi. Olguların dördüne cerrahi drenaj uygulandı. Tüm hastalarda tedaviye yanıt alındı.

Sonuç: Spontan piyojenik spondilodiskit nadir bir hastalıktır. Ancak akut ya da subakut belağrısı ile gelen her hastada, özellikle diyabetes mellitusu olan ya da ileri yaşta olan hastalarda düşünülmelidir. Erken tanı, uygun medikal tedavi ve gerektiğinde cerrahi müdahale ile iyileşme oranı yüksektir.

Anahtar kelimeler: Diskit, piyojenik, spontan spondilodiskit

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INTRODUCTION

Spondylodiscitis is the infection of intervertebral disc and the adjacent vertebrae (1). Etiologically it may be classified as pyogenic, granulomatous (tuberculosis, brucellosis, fungal) and parasitic (2).

Pyogenic spondylodiscitis often develops following spinal surgery, whereas spontaneous pyogenic spondylodiscitis is rare (3). Although rare, spondylodiscitis is the main clinical manifestation of haematogenous osteomyelitis in patients at 50 years old or older (2). In the literature, it has been shown that it has bimodal peaks, below 20 years old and above 50 years old (2).

Nonspecific symptoms such as fever, back pain, localized tenderness and neurologicl symptoms may be seen in patients (4). Absence of specific findings may lead to delay in diagnosis and high morbidity and mortality (4). In most of the cases, a predisposing cause such as diabetes mellitus (DM), alcoholism, HIV infection, spinal structure disorders and local or systemic infection source is present (2).

In this case series, it is aimed to evaluate the clinical characteristics, predisposing factors, treatment and results of spontaneous spondylodiscitis followed in our clinic for a 5 year of period.

MATERIAL AND METHOD

Files of 13 consecutive patients diagnosed with spontaneous pyogenic spondylodiscitis and hospitalized in our clinic between 01.01.2007-31.12.2014, were evaluated retrospectively. Diagnosis was based on clinical presentation, laboratory findings such as increased white blood cell count (WBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) as laboratory markers of inflammation, blood or biopsy culture results and magnetic resonance imaging findings consistent with the diagnosis. The demographic characteristics, history, predisposing factors, laboratory and radiological data, the isolated microorganisms and the treatment responses were evaluated.

RESULTS

Of the 13 patients evaluated, 8 were male and 5 female. Their age range was 19-87 (mean: 61). The epidemiological and clinical charcteristics are shown in Table-1. All patients were admitted with lower back pain. Nine of the patients had fever of 38°C or more, and 8 had neurological findings, with 4 having sensory loss and the other 4 having muscle weakness. All these cases were accompanied by paravertebral abscess. DM was present in 9 of the cases, in 3 of these cases, DM was uncontrolled. Three of the patients were end-stage fenal failure and undergoing dialysis. The duration of symptoms before the diagnosis ranged between 15-180 days. The laboratory features, the isolated microorganisms, and

Table-1: The epidemiological and clinical characteristics of the cases

Case	Age	Gender	Fever (≥38°C)	Regional sensitivity	Duration of Symptom[a] (days)	Diabetes mellitus	Other underlying diseases
1	49	F	Yes	Yes	90	No	ITP, steroid use
2	65	M	Yes	Yes	90	Yes	Prostatic hypertrophy
3	75	F	Yes	Yes	30	No	HT, bladder cancer
4	72	M	No	No	30	Yes	
5	46	M	No	Yes	90	Yes	
6	72	M	Yes	Yes	120	No	
7	48	M	Yes	Yes	180	Yes	
8	78	F	Yes	Yes	30	Yes	ESRD
9	80	F	No	Yes	45	Yes	ESRD
10	87	M	Yes	Yes	40	Yes	HT, trauma, chronic renal failure
11	59	F	No	Yes	90	Yes	ESRD
12	19	M	Yes	Yes	15	No	Trauma
13	43	M	Yes	Yes	90	Yes	

M: Male, F: Female, ITP: Immune Thrombocytopenic Purpura, HT: Hypertension, ESRD: End Stage Renal Disease

[a]The presence of one or more of the indicated symptoms: Low back pain, chills, shaking, loss of appetite, weight loss

Table-2: The laboratory results of the cases, isolated microorganisms, and their treatment

Case	WBC (↔L)	CRP (mg/l)	ESR (mm/1h)	The media where the microorganism was isolated	Microorganism	The region of the lesion	Presence of abscess	Treatment
1	17.800	322	124	Blood culture Biopsy culture	MSSA	L4-5	Multiple: iliopsoas, gluteal, femoral	Cefazolin 3x2 gr IV 6 months + Rifampicin 2x300 mg oral 6 months
2	20.270	159	110	Blood culture	Klebsiella sp	L4-5	Paravertebral	Levofloxacin 1x750 mg IV 3 weeks, then oral 3 weeks
3	21.920	300	119	Blood culture	MSSA	T5-6	No	Cefazolin 3x2 gr IV 6 hafta
4	15.500	270	90	Blood culture	MSSA	T9-10	No	Cefazolin 3x2 gr IV 3 weeks, Rifampicin 2x300 mg oral + Fucidic acid 3 weeks
5	12.730	73	87	Biopsy culture	MSSA	T3-4	Paravertebral	Cefazolin 3x2 gr IV 4 hafta+ Rifampicin 2x300 mg oral 7 days, then cephalexin 2 weeks
6	14.900	189	94	Blood culture Biopsy culture	MSSA	L2-3-4	Paravertebral	Cefazolin 3x2 gr IV 4 weeks + then cephalexin oral 14 days
7	12.500	150	85	Blood culture CSF culture	MSSA	L4-5	No	Cefepime 3x2 gr IV 8 weeks + Rifampicin 2x300 mg oral 8 weeks then TMP/SMX forte 2x1 + Fucidic acid 2x500 mg oral 1 year
8	15.000	250	78	Blood culture	Enterococcus sp	L3-4	No	Ampicillin/sulbactam 1x1 gr IV 3 weeks then Ciprofloxacin 2x250 mg + Amoxicillin clavulanate 1x1000 mg oral 9 weeks
9	11.810	128	114	Biopsy culture	Enterococcus avium	T11-12	No	Teicoplanin 400 mg every 72 hours 6 weeks
10	27.000	206	98	Blood culture	MSSA	T10-11	No	Ampicillin/sulbactam 3x1 gr IV 3 weeks then Ciprofloxacin 2x750 mg + Rifampicin 2x300 mg oral 3 weeks
11	19.230	280	140	Biopsy culture	MSSA	T7-8	Paravertebral	Cefazolin 2x1 gr IV 4 weeks + then cephalexin 2x250 mg oral 6 months
12	8.530	14	10	Blood culture Biopsy culture	MSSA	T12-L1	Paravertebral	Cefazolin 3x2 gr IV 3 weeks then Ciprofloxacin 2x750 mg + Rifampicin 2x300 mg oral 6 weeks
13	10.100	45	52	Biopsy culture	MSSA	T10-11	Paravertebral	Cefazolin 3x2 gr IV 4 weeks then Ciprofloxacin 2x750 mg + Rifampicin 2x300 mg oral 3 weeks

WBC: White Blood Cell, ESR: Erythrocyte Sedimentation Rate, CRP: C-Reactive Protein, CSF: Cerebrospinal Fluid, MSSA: Methicillin Susceptible Staphylococcus aureus

the treatment are shown in Table-2. S.aureus was the most prevelant microorganism. All isolated S.aureus strains were methicillin-sensitive. One of our cases was accompanied by S. aureus meningitis. One area was affected in the vertebrae except one case. The affected areas were thoracic in 8 cases, and lumbar vertebrae in 5 cases. The treatment was initiated with cefazolin in 7 cases with the active agent MSSA, with cefepime in case accompanied by meningitis, and in one case, ampicillin sulbactam due to renal failure. In one case where Enterococcus was isolated as the active agent, ampicillin sulbactam was used, and in the other case, teicoplanin was used. The case with Klebsiella spp was treated with levofloxacin. Surgical drainage was performed in 4 cases with paravertebral abscess and insufficient improvement achieved with antibiotics, one had laminectomy and drainage. All patients responded to treatment.

DISCUSSION

Although rare, spontaneous pyogenic spondylodiscitis is an important clinical manifestation due to its nonspecific symptoms that cause delayed diagnosis (4). In the literature, it was shown to have bimodal peaks, one below 20 years old and the other at 50 years old and over, but all age groups may be affected (2,3,5,6). One case among 13 cases in our study is below 20 years old, and cases are above 50 years old. Spontaneous pyogenic spondylodiscitis is seen mostly in men, male to female ratio have been reported to be 1.5-2:1 (2,5-7). Eight patients (8/13) in our study were male in comparison with the literature.

The symptoms of spontaneous pyogenic spondylodiscitis are nonspecific (2). The most common symptom in the literature are defined as low back pain, but it was also stated that 15% of them may be painless (2). Fever was seen in half of the cases, and neurological symptoms were seen in 1/3 of the patients (8,9). All patients enrolled in our study had low back pain, nine had fever, and eight had neurological symptoms.

The duration of symptoms ranged between 15-180 days. The long duration of symptoms before the diagnosis reflects the delay in diagnosis (9). From our cases, the one at 19 years old admitted to the hospital in as short period as 15 days after fever and low back pain appeared to be due to trauma. However, our case with only low back pain, which is 48 years old was treated symptomatically with only analgesics before his hospital admission. Low back pain is a common complaint due to various reasons, so many patients delay their application to a health center or a hospital. Again, most of these patients initially have symptomatic treatment. Although the diagnostic methods progress, the diagnosis is often delayed. The mean time of diagnosis is reported to be between 45-180 days. In patients with delayed diagnosis, the neurological impairment rate is increased.

In many studies a predisposing disease is defined. DM is the most common identified risk factor, with advanced age, immunosuppression, malignity, chronic renal failure, liver cirrhosis, HIV infection being the other risk factors (10-14). In our patients, DM was also detected as the most common predisposing disease. One of our cases had chronic renal failure, and 3 cases were end-stage renal disease patients.

ESR is an indicator with high sensitivity, but its specificity is low. Many studies reported that ESR increased in more than 90% of the cases. Its mean value ranges between 43mm/h and 87mm/h (15-18). No significant correlation could have been demonstrated between the severity of the infection and the age of the patient (2). Similarly, CRP was found to be higher in the majority of the patients with pyogenic spondylodiscitis (2,6,16). In patients who were successfully treated, CRP level was shown to decrease to normal levels in 3 months of follow-up (19). WBC level was found to be high in only 1/3 of the patients (15-18).

In the majortiy of our patients, ESR, CRP, and WBC were detected to be high. The mean values were 92 mm/h, 183 mg/l, and 15.9, respectively.

The most common microorganism is Staphylococcus aureus in pyogenic spondylodiscitis. In different studies, this ratio has been reported to be between 20%-84% (2,5,16-18). The second most common microorganisms are gram-negative bacteria (7%-33%). Enterobacteriaceae family (Escherichia coli, Proteus spp., Klebsiella spp., Enterobacter spp.) from gram-negative bacteria comes first (2,5,16-19). Enterococcus is reported to have a rate of 5-20% (20,21). In our study, S. aureus was again the most common microorganism. Klebsiella spp. was isolated from one case, and Enterococcus spp is isolated from 2 cases.

It is recommended to obtain two sets of blood cultures (aerobic and anaerobic) from all patients with spontaneous spondylodiscitis prediagnosis (4). Blood culture is a simple and cost-effective method to identify the microorganism in spondylodiscitis. The blood culture positivity in pyogenic spondylodiscitis is between 40-60% (2,4,14,17). Vertebral biopsy is important and well-established in the diagnosis (4). Culture positivity in vertebral biopsy in studies is between 19-100%. In the recently published IDSA guideline, it is recommended to perform vertebral biopsy under imaging guidance, when the microorganism cannot be detected by

blood cultures (4). In our clinic also, in the absence of reproduction by the blood cultures, vertebral biopsy was performed under imaging guidance. However, vertebral biopsy is performed in patients in whom surgical drainage was done for treatment. In our study, culture positivity was obtained in 5 cases at blood culture, in 4 cases at tissue biopsy culture, in 3 cases at blood and tissue biopsy culture, and in one case at blood and cerebrospinal fluid (CSF) culture. In all cases with tissue biopsy culture, the microorganism was isolated. Blood culture was taken in all cases, in 9 of 13 cases, the microorganism was isolated from the blood culture.

Meningitis, developing as a complication of spondylodiscitis is very rare in the literature and causes high mortality and morbidity (22-24). One of our cases was followed for S. aureus meningitis due to spondylodiscitis, and S. aureus was isolated from the blood and CSF cultures of this case.

It is not a surprise of lumbar region to be affected postoperatively due to the higher number of lumbar surgeries in spondylodiscitis cases. However ,spontaneous pyogenic spondylodiscitis most commonly affects the lumbar region, followed by thoracic region, and least the cervical region (2,3,6,20). This ranking is associated to the regional blood supply rates (2). In 8 of our cases, the thoracic region, and in 5 cases, the lumbar region was affected. In none of our cases, the cervical region was affected.

The aims of the treatment are the eradication of the infection, the protection of the structure and the function of the vertebrae and to reduce the pain (2). As antibiotics, 6 weeks of treatment is recommended with agent-specific and intravenous agents, or oral agents with high bioavailability (4). The dose and duration of the IV antibiotics use is well-established in spondylodiscitis. However, antibiotics with high oral bioavailability and good tissue penetration such as rifampicin, quinolones, clindamycin, and fusidic acid are also among the treatment alternatives (2,4,5,25). In our cases, the oral treatment alternatives with high bioavailability were used following their intravenous administration.

As a result, spontaneous pyogenic spondylodiscitis is a rare disease. However, in all patients presenting with acute or subacute low back pain, it should be considered especially in patients with DM or at advanced age. The cure rate is high with early diagnosis, appropriate medical treatment, and surgical intervention, when necessary.

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