



Management of spontaneous spondylodiscitis conservative versus surgical treatment

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Abstract

Background: There is a noted rise in the incidence of spontaneous spondylodiscitis per year and this is probably because of the increased aging population, rising incidence of immunodeficiency and better radiological technique that helps diagnosis the disease earlier.

Aim of Study: To compare the results of both surgical treatment and conservative management of spontaneous spondylodiscitis in the light of clinical outcome, radiological outcomes, and complications.

Patients and Methods: This is a prospective randomized clinical trial study including 32 patients diagnosed clinically, radiologically, laboratory with spontaneous spondylodiscitis either cervical, dorsal or lumbar. They were divided into 2 groups: One treated conservatively and the other surgically.

Results: 16 patients were treated conservatively and 16 were managed surgically. After complete course of treatment; only 10 patients of conservative group and 13 patients of surgical group showed fusion assessed by imaging. There was no significant statistically difference between two groups in final clinical outcome using visual analogue scale and MacNab's outcome criteria.

Conclusion: Both conservative and surgical methods are nearly equivalent in reaching the aims of management of spontaneous spondylodiscitis because they are safe, achievable, and effective procedures in treating the pain caused by the disease.

Keywords: Spontaneous– Spondylodiscitis – surgical – Discitis – conservative – Spontaneous spine infection – Disc infection

Introduction

SPONDYLODISCITIS incidence is about 2-4% of the total incidence of osteomyelitis infections (**Canale and Beaty; 2012**). The clinical symptoms of Spondylodiscitis are very bizarre and uncharacteristic at the start of the disease, that's why there is a delay in diagnosis (estimated to average 3 months). Delayed beginning of adequate therapy may as well causes progressive worsening of the affected part of the spine, leading to an increased incidence of segmental instabilities and neurological complications. Therefore, early and exact diagnosis is a must now to start the differentiated treatment suitable for the found form and severity of spondylodiscitis (**Canale and Beaty; 2012**)

The aim of this study: To compare the results of both surgical treatment and conservative management of spontaneous spondylodiscitis in the light of clinical outcome, radiological outcomes, and complications.

Subjects and Methods

This is a prospective randomizing clinical trial study including 32 patients with spondylodiscitis in the Neurosurgery Department, Cairo University Hospitals through the period starting from 1/6/2021. They were divided into two groups one treated surgically and the other one underwent conservative management. *Inclusion criteria:* patients that have clinical picture suggestive of spontaneous spondylodiscitis as axial pain, fever, elevated ESR and CRP and imaging studies showing signs of spondylodiscitis.

Exclusion criteria: pediatric age group, patients with history of previous spinal trauma, patients who have neurological deficits or those who developed spondylodiscitis after a spinal surgery.

Conservative management initiated by Bed rest, nonsteroidal anti-inflammatory drugs, broad-spectrum intravenous antibiotics as cefotaxime 1gram in combination with amoxicillin/clavulanate 1.2 gram then the choice of the antibiotics was adjusted later according to the subsequent bacterial culture and sensitivity for 2 weeks, followed by 4 weeks oral antibiotics. Neck collar or rigid brace may be used during treatment to minimize the pain and prevent instability.

Surgical management: After administration of general anaesthesia to patients in surgical group, the surgery performed differed depending on the region affected; In cervical region, we used anterior approach for debridement of the infected disc material then an artificial cage was introduced between 2 endplates of vertebrae. While in the dorsal and lumbar regions, we followed a posterior approach for laminectomy and debridement of affected bone and disc with trans pedicular screws fixation. Histopathology tissue sample was obtained during Surgical Debridement.

Outcome measurement:

Clinical outcome: was checked 24 hours after surgery or at the time of discharge after conservative management, then at 3 and 6 months intervals. We assessed patients clinically by evaluating the severity of pain and the functional status of the patients using Visual Analogue Scale (VAS) and MacNab's outcome criteria (functional scale) in this order of frequency.

Laboratory outcome: White blood cells count, ESR and CRP were assessed weekly after the start of treatment during the hospital stay. If still elevated, we changed the type of antibiotics according to bacterial and blood cultures if positive.

Radiological outcome: X-ray, CT and MRI of the spine were performed after 3 months, 6 months interval to assess the effect of treatment regarding fusion.

Follow-up of complications was done to both groups as; surgical complications, failure of conservative management, psychological effect as depression from the long period of hospital stay and analgesics and side effects of drugs.

Results

Conservative group: After complete course of treatment (6 weeks) blood parameters (ESR, CRP, and WBC) showed normalization in 5 cases (31.25%), stationary in 7 cases (43.75%) and progression 4 cases (25%). Regarding complications, 3 patients (18.75%) displayed failure of conservative management after 6 weeks as they developed motor weakness in form of lower limb weakness and were operated via debridement and fixation. The partially recovered patients with mild back pain were 3 (18.75%) were complaining from psychological effects (in the form of depression) and gastric problems from the long use of non-steroidal antiinflammatory drugs. After 3 months of starting treatment radiological outcome was assessed using CT spine and MRI spine; 10 cases (62.5%) show solid fusion and 6 cases (37.5%) show no fusion; who underwent further instrumentation.

Surgical group: Regarding laboratory investigations normalization was in 10 cases (62.5%), stationary in 4 cases (25%) and progression in 2 cases (12.5%). Disc space biopsies using tissues obtained during surgery revealed microbial growth in 10 patients (62.5%); 3 of them (30%) were TB granuloma (tuberculosis),

while pyogenic abscess (*Staphylococcus aureus*) was identified in the 7 of them (70%) and in 6 patients (37.5%) no organism could be detected. Regarding complications, 3 patients (18.75%) suffered from sacroiliitis that were operated on lately by injection and one patient (6.25%) was complaining of one lower limb weakness after surgery. Post-operative plain X-ray showed mal direction of the screws. Redirection of screws was done the same day but the patient did not improve. 6 months later, lower limb weakness and pus discharge from the site of wound occurred and extraction of rods and screws was done. After 3 months of starting treatment radiological outcome was assessed using CT spine and MRI spine; 13 cases (81.25%) show solid fusion and 3 cases (18.75%) show no fusion.

Clinical outcome:

- A. Functional outcome according to visual analogue scale VAS: All patients (surgical and conservative ones) before start treatment had visual analogue scale 6-8 with mean 7. Regarding patients with conservative management; 7 patients (43.75%) are completely recovered with VAS (0), 4 patient (25%) partially recovered with VAS (4) and the last 5 patients (31.25%) worsen or unchanged with VAS (8) with mean VAS 4.67 ± 2.65 . After treatment: Out of the surgical managed patient 12 patients (75%) are completely recovered with VAS (0), 3 patient (18.75%) partially recovered with VAS (4) and the last one patient (6.25%) worsen or unchanged with VAS (8) with mean VAS 3.14 ± 2.27 . The post management VAS in both groups (conservative and surgical ones) did not show any significant statistically difference
- B. Functional clinical outcome according to MacNab's criteria: After 6 months of start of treatment functional clinical outcome (MacNab's outcome criteria) of recovery showed in conservative group: Excellent in 4 patients (25%), good in 7 patient (43.75%), fair in 2 patients (12.5%) and poor in 3 patients (18.75%). In surgical group: Excellent in 9 patient (56.25%), good in 6 patients (37.5%), and poor in one patient (6.25%). These results did not show any significant statistics. As shown in figure (1)

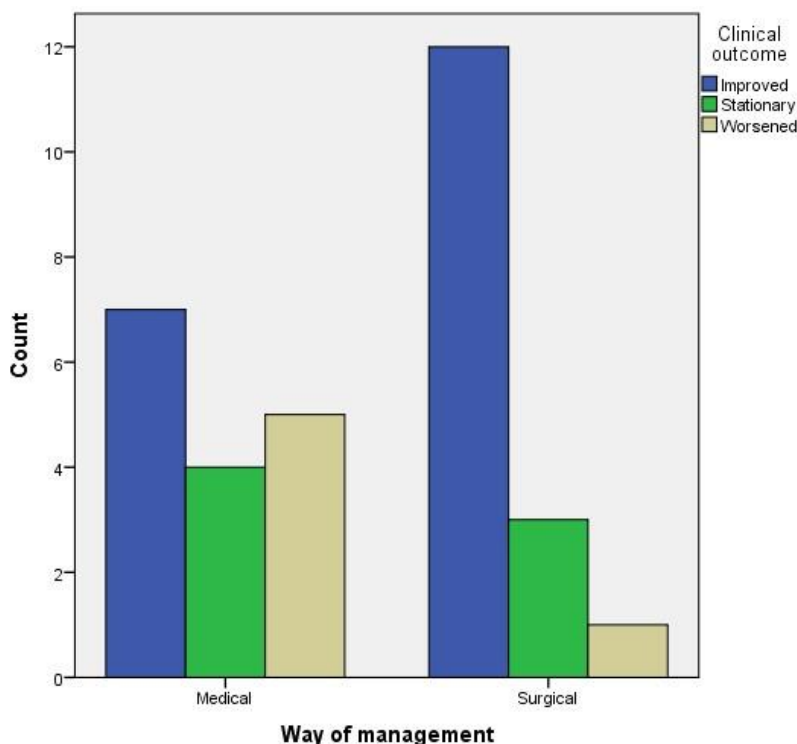


Fig (1)

Discussion

In *our study*, the age group of the patients ranged from 43 and 66 years old, as regards sex distribution 62.5% were males, and 37.5% were females. While in **Waheed et al (2019)** they treated 44 consecutive patients with a diagnosis of spontaneous spondylodiscitis and Patients had an age range between 13–65 years, and there was a slight male predominance (59.1%).

While **Giordan et al (2019)** in which 181 patients of spontaneous spondylodiscitis managed, the age range was between 16–89 years, with a significant proportion of patients older than 60 years (71%). Patients who underwent surgical treatment were significantly younger (mean age at presentation: 52.7 years) than patients who were medically treated (mean age at presentation: 64.8 years). The male: female ratio was 2.06:1, and 32.7% of patients were female.

As regards chronic medical disorders in *our series*, the higher percentage was for diabetes mellitus (56.25%), hypertension (37.5%) and hepatitis c (6.25%). **Giordan et al (2019)** reported that among conservatively treated patients, 35% had type II diabetes mellitus, 27% had hypertension or chronic obstructive pulmonary disease, and 8.8% had no other medically relevant comorbidities.

Regarding the diseased spine segments, *our study* showed that different levels included and the lumbar region was the most affected segment (81.5%) compared to the dorsal segment (6.25%) and the cervical region (12.5%). Also **Waheed et al (2019)** mentioned that the most common affected spine region in their series was the lumbar region (26 patients out of 44 patients) and **Kamal et al (2020)** mentioned that thoracic involvement was (16/39 patients, 41%), thoraco-lumbar junction was (6/39 patients, 15.4%), lumbar and lumbo-sacral was (15/39 patients, 38.6%).

On the other hand, **Zaveri et al (2009)** reported that the lumbar and lumbosacral region were exclusively affected in a series of 15 patients, **Zhang et al (2007)** treated 23 patients with upper thoracic region only, **Turel et al (2017)** did minimal invasive spine decompression and/or discectomy for their patients (total 7), 5 patients had lumbar infections and two had thoracic infections.

In pre-operative laboratory assessment, *our series revealed* that all cases had elevated ESR preoperative with 95% had positive CRP. In **Sudprasert et al (2015)** case series all cases showed elevated ESR and positive CRP. **Griffith-Jones et al (2018)** showed high preoperative ESR & CRP values with the mean preoperative ESR at the first hour was 160 and CRP was 188. Also **Waheed et al (2019)** noted that the ESR was elevated in all the patients with a mean of 64.3 mm in the first hour The CRP level was high (mean 25.7 mg/dl, range 6–98 mg/dl) in all the patients.

Treatment of spine infection remains a challenge for spine surgeons, with the most effective method still being a matter of debate. Most surgeons agree that in early stages of infection, antibiotic treatment should be pursued; under certain circumstances, however, surgery is recommended. In a case series of 90 patient **Tsai et al (2017)** noted that early surgery with antibiotics treatment had better clinical outcomes than antibiotics treatment alone in patients with pyogenic spondylodiscitis and reported that infection control was similar for both groups, patients treated with early surgery and antibiotics were hospitalized for fewer days and required less antibiotics than those treated with antibiotics alone, also having better functional outcomes.

Some agreed with us about improvement after debridement and instrumentation regardless the performed approach as **Ozlay et al (2010)** Fourteen out of 16 patients (87.5%) were completely relieved of pain and fully active, the other two patients obtained a good result. All 7 patients who had a neurological deficit improved. Also, **Zhang et al (2007)** where 19 patients with preoperative neurologic pain improved greatly postoperatively. **Griffith-Jones et al (2018)** reported All patients (10 patients) significantly improved

regarding their pain after surgery. While **Tsai et al (2017)** described a greater improvement in their pain in decompression alone group than fusion group.

Regarding the follow up of the laboratory findings 62.5% of the surgical group patients ESR and CRP were normalized while only 31.25% of the conservative group of patients the results were normalized. **Noha et al (2017), Kamal et al (2020), Fleege et al (2012) and Tsai et al (2017)** showed close results regarding the surgical group.

In the study conducted by Lim et al., the mean VAS score was 7.43 ± 0.54 at the pre-operative period, and 2.07 ± 1.12 at final follow-up (**LIM et al.,2008**). We and Pee et al., showed similar improvement in VAS scores of both groups at the end of followup period (**PEE et al., 2008**). Our functional clinical outcome MacNab's criteria results nearly agreed with the results of the study performed by Ozalay et al., (**OZALAY et al.,2010**) on 16 patients with non-tuberculous thoracic or lumbar spondylodiscitis; where 75% were completely relieved of pain and fully active. These result also contrary to Pee et al., (**PEE et al., 2008**). who used the Oswestry Disability Index (ODI), while Lee et al., (**LEE et al.,2004**) did not use any specified scale in the functional assessment.

Conclusion

Both conservative and surgical methods are nearly equivalent in reaching the aims of management of spontaneous spondylodiscitis because they are safe, achievable, and effective procedures in treating the pain caused by the disease.

Conflicts of Interest: The authors declare no conflict of interest.

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