Case Report

Clostridium perfringens in the spine: A rare cause of post-surgical infection

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ABSTRACT

Background: Post-surgical infections of the spine occur in from 0% to 18% of cases. Postoperative spine infections due to Clostridium Perfringens (CP) resulting in necrotizing fasciitis are extremely rare. However, since they may be fatal, early and definitive treatment is critical.

Case Description: A 62-year-old male with a T8-T9 Type C fracture, in ASIA Grade "E" (neurologically intact) underwent a posterior T6-T10 arthrodesis. However, 2 weeks postoperatively, he developed a postoperative thoracic wound infection; the cultures were positive for CP. As the patient developed necrotizing fasciitis, emergent debridement, negative pressure continued drainage, and initiation of appropriate antibiotic therapy were critical.

Conclusion: Postoperative spinal infections due to CP with accompanying necrotizing fasciitis are extremely rare. As these infections may be fatal, they must be rapidly diagnosed and treated.

Keywords: Clostridium perfringens, Discitis, Necrotizing fasciitis, Postoperative infection, Spine

INTRODUCTION

Clostridium perfringens (CP) is a gram-positive anaerobic spore-forming microorganism found in the gastrointestinal tract and is the most common cause of gas gangrene. As CP can result in necrotizing fasciitis, with rapid progression to myonecrosis, gas production, and sepsis, CP must be rapidly diagnosed and treated (i.e. with antibiotics and surgical debridement).[9] Here, we report a 62-year-old male who, 2 weeks following a T6-T0 instrumented fusion, developed CP with necrotizing fasciitis that was immediately diagnosed and treated with operative debridement, continued negative pressure suction, and appropriate antibiotic therapy.

CASE REPORT

A 62-year-old male presented with a T8-T9 Type C fracture; neurologically intact [Figures 1 and 2] he underwent an open reduction with a transpedicular T6-T10 fusion; no decompression was warranted. Seven days post-discharge, he presented with new serous fluid draining through the discolored wound; within 12 h, the grayish malodorous fluid was accompanied by "bubbles.”
Lab studies

Blood tests showed an elevated erythrocyte sedimentation rate (ESR 96 mm/H), a high C-reactive protein (CRP 12.6 mg/L), and increased peripheral leukocyte count (WBC 15,200/μL); all studies were consistent with sepsis.

Diagnostic studies

As the thoracic CT scan showed gas within the T6-T10 thoracic wound T6-T10 [Figure 3], the patient underwent an emergency decompressive procedure with/wash-out, and the placement of an intermittent negative pressure suction system [Figure 4]. At surgery, 100 mL of grossly purulent material was found along with necrotizing fasciitis (i.e., lysis of fascia and paravertebral muscles).

Antibiotic therapy

Cultures were taken which later showed CP. Although intravenous vancomycin was initially started...

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**Figure 1:** Computed Tomography Scan (a) Sagittal view (b) Axial view (c) Coronal view. lesion type C T8-T9.

**Figure 2:** Magnetic resonance imaging T2 (a) Sagittal view (b) Axial view (c) Coronal view. It evidence lesion type C T8-T9.

**Figure 3:** Computer tomography Scan (a) Sagittal view (b) Axial view (c) Coronal view. Yellow arrows indicate presence of gas.
postoperatively, 5 days later, the CP cultures showed sensitivity to Ceftaroline.

**Postoperative course**

Surgical wash-outs and drainage with the negative pressure suction system were repeated 4 times over 3 weeks During which time the patient continued to improve. He was discharged after 6 postoperative weeks, and of interest, the patient retained the transpedicular instrumentation system without the need for revision 6 months postoperatively [Figure 5].

**DISCUSSION**

The presence of primary spine infections due to CP are rare,[1,3,6,11-15] [Table 1]. We defined 4 such similar cases in the literature, and added our 5th case to this list.[2,5,10] [Table 2].

**Necrotizing fasciitis due to CP**

Necrotizing fasciitis due to CP usually occurs in the 2nd postoperative week. A CP infection of the spine usually causes the new onset of pain, fever, and potential neurological dysfunction, depending upon its location spine). Typically, there is a serious exudate that is grayish and contains bubbles.

**Lab studies typical for CP**

Laboratory tests for CP often demonstrate elevation of the peripheral white blood cell count plus acute phase reactants such as CRP, and the erythrocyte sedimentation rate.

**Radiologist studies for CP**

Radiographic studies for CP classically demonstrate gas within the wound and paravertebral space. As these lesions

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**Table 1:** Primary cases of discitis and spondylodiscitis due to clostridium perfringens.

| Author          | Publication year | Patients | Age | sex   | Localization | Symptoms        | Outcome |
|-----------------|------------------|----------|-----|-------|--------------|-----------------|---------|
| Pate and Katz  | 1979             | 1        | 62  | Female| Discitis L3-L4 | Lumbar pain     | Alive   |
| Beguiristain et al. | 1986          | 1        | 33  | Male  | Discitis L1-L2 | Lumbar pain     | Alive   |
| Caudron et al.  | 2008             | 1        | 79  | Female| Discitis L4-L5 | Lumbar pain     | Alive   |
| Marin et al.    | 2014             | 1        | 65  | Male  | Spondylodiscitis L1-L3 | Fever, lumbar pain | Dead     |
| Lotte et al.    | 2014             | 1        | 83  | Female| Discitis L4-L5 | Lumbar pain     | Alive   |
| Akagawa et al.  | 2015             | 1        | 78  | Female| Spondylodiscitis T11-T12 | Dorsal pain | Alive   |
| Seller et al.   | 2016             | 1        | 64  | Male  | Spondylodiscitis L5 | Lumbar pain     | Alive   |
| Yong and Lam    | 2017             | 1        | 80  | Male  | Discitis T10-T11 | Dorsal pain | Alive   |
| Bhatt and Singh | 2021             | 1        | 64  | Male  | Discitis L5-S1 | Lumbar pain     | Alive   |

**Table 2:** Cases of post-surgery infection of clostridium perfringens.

| Authors          | Publication year | Patients | Age | sex   | Localization site of infection | Treatment | Symptoms | Outcome |
|------------------|------------------|----------|-----|-------|--------------------------------|-----------|----------|---------|
| Brook and Frazier| 1999             | 2        | NA  | NA    | NA                            | NA        | NA       | NA      |
| Kristopatis et al.| 1999            | 1        | 76  | Male  | L4-L5                         | NA        | Lumbar pain and meningitis | Alive   |
| Bednar           | 2002             | 1        | 68  | Male  | L4-L5                         | Surgery, antibiotic treatment | Lumbar pain | Alive   |
| Marroquin-Herrera et al. | 2021  | 1        | 62  | Male  | T6-T10                        | Surgery, antibiotic treatment | Dorsal pain and outflow of grey and purulent liquid | Alive   |

NA: Not mentioned in the article
may prove fatal, they typically warrant emergent surgical debridement/wash-out, continued negative pressure drainage, and appropriate antibiotic therapy.[7,8,9]

CONCLUSION

CP is a rare cause of postoperative spine infections. As necrotizing fasciitis attributed to CP can be fatal, it should be rapidly diagnosed and treated (i.e., with operative debridement, continued negative suction drainage, and antibiotic therapy).

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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