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Title: Recurrent anterior cervical wound abscesses following cervical corpectomy and fusion surgery from an odontogenic source mimicking an esophageal perforation: a case report

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1 **Recurrent Anterior Cervical Wound Abscesses Following Cervical**
2 **Corpectomy and Fusion Surgery from an Odontogenic Source Mimicking**
3 **an Esophageal Perforation: A Case Report**

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13

14

15 **Abstract**

16

17 Background Context: Infection is an uncommon complication of anterior cervical
18 spine surgery. Most deep postoperative infections are thought to be related to
19 occult esophageal perforation. Direct inoculation from the oropharynx has not
20 been previously reported in the literature.

21 Purpose: The purpose of this study is to report a case of recurrent infection after
22 anterior cervical decompression and fusion suspected to have resulted from
23 direct communication between the oropharynx and deep neck space.

24 Study Design: This study is a case report.

25 Methods: This study included longitudinal clinical and radiological follow-up.
26 Results: A 48-year-old female who underwent anterior cervical corpectomy and
27 fusion from C3-6 and posterior spinal fusion from C3-7 presented at two weeks
28 and five months post-operatively with a deep neck space infection. She
29 underwent surgical debridement each time. Workup of the second infection
30 found a subtle cortical breach in the mandible at the site of prior invasive dental
31 work.

32 Conclusions: This case describes the workup and management of a patient who
33 presented with recurrent deep neck space infection following anterior cervical
34 spine surgery. This is the first report of a post-operative infection related to direct
35 communication between the oropharynx and deep neck space via a cortical
36 breach of the mandible.

37
38 Keywords: Infection; anterior cervical corpectomy and fusion; anterior cervical discectomy and
39 fusion;
40 recurrent abscess; odontogenic infection; cervical spine.

41
42 **Introduction**
43

44 Anterior cervical decompression and fusion is a well-accepted treatment for
45 patients with cervical radiculopathy and myelopathy, comprising over 1,000,000
46 procedures in the United States between 2002 and 2009 [1, 2]. The most
47 common complications are dysphagia, wound hematoma, and recurrent
48 laryngeal nerve palsy [3]. Wound infections and abscesses are rare, with a
49 reported incidence between 0.1-1.6% [3-5] and are typically associated with

50 esophageal perforations [6]. We report on a patient who developed recurrent
51 wound abscesses after an anterior cervical corpectomy and fusion.

52

53 **Case Report**

54

55 A 48-year-old female with symptomatic cervical kyphosis, stenosis, and
56 myeloradiculopathy underwent an uncomplicated anterior cervical corpectomy
57 and fusion from C3-6 with fibular strut grafting and posterior spinal fusion from
58 C3-7 using iliac crest autograft (Figure 1). Vancomycin 1g was given pre-
59 operatively and for twenty-four hours post-operatively. An anterior Jackson-Pratt
60 drain was removed on post-operative day one, and she was discharged home
61 without complication on post-operative day three.

62

63 Two weeks later, she reported purulent drainage from the drain site with neck
64 movement and swallowing but denied dysphagia or odynophagia. She
65 presented with swelling over her healed incision with frank pus expressible from
66 the drain site. A surgical incision and drainage was performed, and a 2x2cm
67 abscess was found underneath the platysma. The esophagus was fully intact on
68 external visualization as well as on esophagoscopy by the Otolaryngology
69 service. Cultures grew *microaerophilic streptococci*, which the infectious disease
70 service determined had originated from the oropharynx. A negative barium
71 esophagram ruled out occult esophageal injury. It was later revealed that she

72 had had a tooth extraction and root canal within one month prior to her index
73 surgery. The patient improved with two weeks of oral moxifloxacin.

74

75 Five months later, she returned with a 3cm mass again in the anterior cervical
76 wound area that was erythematous and tender to palpation. White blood cell
77 count and C-reactive protein were elevated. By the next morning, her neck
78 swelling had doubled and spread across midline with extension of erythema to
79 the mandible (Figure 2). Another workup for esophageal perforation was initiated
80 and barium esophagram was again negative (Figure 3). Further questioning
81 revealed that she had three abscessed teeth extracted within six weeks and two
82 fillings placed within days of symptom onset. CT scan of the mandible
83 demonstrated a lateral cortical breach at the site of a prior tooth extraction
84 adjacent to a recently filled tooth, resulting in a potential tract between the
85 oropharynx and neck (Figure 4). The abscess was debrided, intraoperative
86 cultures were negative, and the infectious disease service recommended six
87 weeks of oral moxifloxacin. Oral Maxillofacial Surgery recommended against
88 surgical treatment of the breach or inpatient treatment of her abscessed teeth.
89 Therefore, she underwent outpatient extraction of her remaining infected teeth.
90 She has had no further recurrence of infection in the two years since her second
91 debridement.

92

93 **Discussion**

94

95 Infections following ACDF are rare with a reported incidence between 0.1-1.6%
96 [3-5]. Most cases are associated with esophageal injuries, but two cases of late
97 infection have been reported with unclear etiologies. In one case, a retro-
98 esophageal abscess developed four years after a one level fusion [7], while the
99 other reports a prevertebral abscess two years after a one level fusion [6]. In
100 both cases, no esophageal perforation was identified and the source of the
101 infection remained unclear.

102

103 In this case, the patient developed abscesses twice within six months of the
104 index surgery. During workup of the first abscess, no esophageal perforation was
105 found, but an organism associated with the oropharynx was identified. Therefore,
106 the initial infection was likely due to hematogenous spread as she had a tooth
107 extraction four weeks and a root canal nineteen days prior to her index surgery.
108 The patient returned five months later with a recurrent abscess temporally related
109 to invasive dental work. It was initially hypothesized that this recurrence was
110 again caused by hematogenous spread of infection, but a CT scan of her
111 mandible demonstrated perforation of the lateral mandibular cortex, creating a
112 potential path for direct local spread to the neck.

113

114 The anatomy of deep neck space infections is well studied. The cervical fascia is
115 comprised of a superficial and deep layer, which creates potential spaces in the
116 neck [8]. The superficial layer of the deep cervical fascia generally forms the
117 superficial border of deep space neck infections. If this layer is intact, infectious

118 material is often unable to extravasate and can accumulate to the point of
119 spreading into the mediastinum or causing airway compromise. The middle layer
120 of the deep fascia, or pretracheal fascia, forms the base of deep neck space
121 infections. Odontogenic infections typically communicate with the submandibular
122 space, which is also bordered by the superficial layer of the deep fascia. A
123 breach of the outer mandibular cortex would lead to direct communication with
124 the submandibular space and therefore the deep space of the neck (Figure 5).
125 Deep neck infections from the submandibular space have an odontogenic source
126 in 85-100% of cases [9, 10].

127

128 This case is a rare complication of ACDF. While some infections after ACDF
129 have been attributed to esophageal perforations, no evidence of such an injury
130 could be found in this case. A thorough history, however, raised suspicion for an
131 odontogenic source, and a communicating tract between the oropharynx and
132 deep space of the neck was recognized on CT scan. This is the first report of an
133 anterior cervical wound infection caused by direct spread from an odontogenic
134 source. Given the close anatomic relation between the mandible, the
135 submandibular space, and the surgical planes involved in deep neck dissection,
136 there is value in investigating a patient's dental history and recognizing direct
137 spread from the oropharynx as a possibility particularly in the setting of invasive
138 dental procedures.

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- 166
- 167

168 Figure Legends:

169 Figure 1. Pre and post-operative radiographs.

170

171 Figure 2. Well healed prior incision is visible with erythema and swelling to the
172 mandible and spreading to the contralateral neck.

173

174 Figure 3. Barium esophagram showing no evidence of perforation.

175

176 Figure 4. CT image of the mandible showing lateral cortical mandibular breach
177 at the site of a prior tooth extraction.

178

179 Figure 5. Submandibular spread of odontogenic infection. (Reprinted from
180 *Contemporary Oral and Maxillofacial Surgery*, 6th Edition, Hupp J., Ellis E.,
181 Tucker M., Chapter 17: Complex Odontogenic Infections, p 328, 2014, with
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