

## Case Report

# Late infection six years post cervical arthroplasty detected following referral to a 2 week-wait head and neck cancer clinic: a case report

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**Received:** 18 January 2019

**Revised:** 04 February 2019

**Accepted:** 05 February 2019

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### ABSTRACT

Late infection after anterior cervical spine surgery (ACSS) is a rare phenomenon and can be extremely challenging to diagnose. Clinical presentation vary and may not present with classical features of fever, pain, malaise or discharge. It can easily be mistaken for a head and neck tumour due to its ambiguous symptoms and signs. We report a case of a 57 years old lady whom was initially referred to the 2 week-wait (2 ww) head and neck cancer clinic. She complained of painless neck lump and dysphagia. She subsequently underwent various investigations including flexible nasendoscopy, ultrasound scan guided biopsy, oesophagogastroduodenoscopy (OGD), CT scan, PET-CT scan and MRI scan. Initial investigations failed to clinch the diagnosis. US and CT scans findings were suspicious for malignancy. All blood results were in normal ranges. It was only after PET-CT scan was done that the diagnosis pathway switched from possible malignancy to purely inflammatory. It showed significant high activity process tracking back to the 6 years old spinal surgery area. This precluded the patient from a planned open biopsy. Radiological imaging such as PET-CT and MRI are essential in both diagnosis and treatment planning.

**Keywords:** Head and neck cancer, Late spinal infection, PET-CT scan

### INTRODUCTION

Infection after anterior cervical spine surgery (ACSS) is rare with a rate of 0.1% to 1.6%.<sup>1</sup> Most infections occur early in the postoperative period, either due to intra-operative bacterial contamination or the spread of surgical skin infections. The incidence rate of late infections after ACSS is even less and its possible aetiologies remain unclear. However, it is known to be associated with other late complication [e.g. oesophageal perforation, bacteraemia, Zenker's diverticulum or implant migration].<sup>2-5</sup>

Dysphagia, on the other hand, is one of the most common complications after anterior cervical spine surgery

(ACSS). Most cases often begin shortly during the postoperative and is usually a transient condition.<sup>6-9</sup>

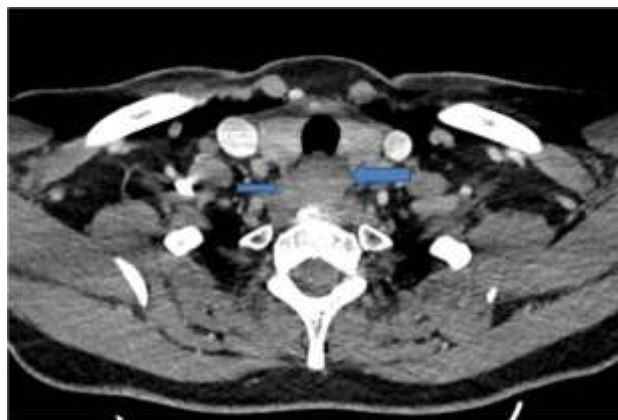
Late infection can be challenging to diagnose, in that clinical presentation may vary and may not present with classical features of fever, pain, malaise, or discharge. There may be no elevation of C-reactive protein (CRP) or white blood count (WBC). Diagnosis can also be difficult on imaging, particularly if not raised as a differential, and as a consequence varying imaging modalities may need to be employed.

We report a case of an unusual isolated late infection not associated with other late complications, referred after 6 years to the 2 week-wait (2ww) head and neck cancer clinic.

## CASE REPORT

A 57 years old lady was initially referred to the 2 weeks-wait head and neck clinic in the Otolaryngology department for swelling overlying the right suprasternal notch and new onset mild to moderate dysphagia to solids over the last two months. There was no fever, sweating, neck or arm pain, dysphonia and no weight loss. On examination there was a fullness overlying the sternal notch but no discrete palpable mass, a healthy scar in the anterior neck was noted which was due to an anterior cervical arthroplasty for brachialgia at C5/6 and C6/7 six years ago. Flexible nasendoscopy (FNE) showed normal pharynx and larynx. An ultrasound scan (US) previously requested in the community showed a possible lesion posterior to the right thyroid lobe that was thought to be related to the oesophagus. A repeat US neck was then performed which showed low reflectivity heterogenous mass posterior to the right thyroid lobe and was too deep for ultrasound-guided fine needle aspiration (FNA). A CT scan of the neck and upper chest was then done and it showed a mass lesion measuring 26 × 19 mm in diameter located posteriorly to the right lobe of the thyroid gland which was confluent with a thickened looking upper oesophagus. These findings were considered suspicious for a tumour in the upper oesophagus either with locally extensive or an confluent with an enlarged para-oesophageal lymph node. Features of previous cervical spine surgery were noted but no obvious destructive bony lesion was identified. The patient subsequently underwent two oesophago-gastroduodenoscopy (OGD) with negative biopsy results before she was listed for pan-endoscopy and an open neck biopsy. During a head and neck cancer multidisciplinary team discussion, a PET-CT scan was requested to be done before proceeding with the open biopsy. This showed significant fluorodeoxyglucose (FDG) avidity in the C5/6 disc space at the site of previous instrumentation. This was contiguous with an FDG avid prevertebral soft tissue, that this was directly connected to the previous surgical area in the cervical spine strongly suggesting an inflammatory process rather than malignancy (Figure 2). This was a 'game-changer' as it removed the urgent need to intervene surgically since the risk of cancer was virtually eliminated and the patient was not septic. Consequently an MRI scan was performed which confirmed an anterior prevertebral collection at the level of T1 adjacent to the oesophagus and again related to the C5/6 disc space. Her blood results showed normal inflammatory markers (WBC 7.1, CRP 2, ESR 12). She underwent removal of 2 levels M6C cervical spine for her presumed infected cervical arthroplasty electively 15 weeks after referral to the spinal team. During the operation there was no gross infective mass or free fluid identified. Phlegmonous tissue and all metalwork were removed and sent for microbiology testing which identified *Propionibacterium Acnes* in the samples. She was discharged after 3 days on long term antibiotics for 6 weeks. In the immediate postoperative period, she did have some issues with swallowing and speech. However, these have improved,

although her mild dysphagia 6 month after her surgery, was still not fully recovered. She could still feel the neck swelling after surgery and antibiotics but it was smaller than before. Her inflammatory markers remain within normal levels. Her last X-ray after surgery showed no anterior collapse, normal cervical lordosis and no bony erosion.



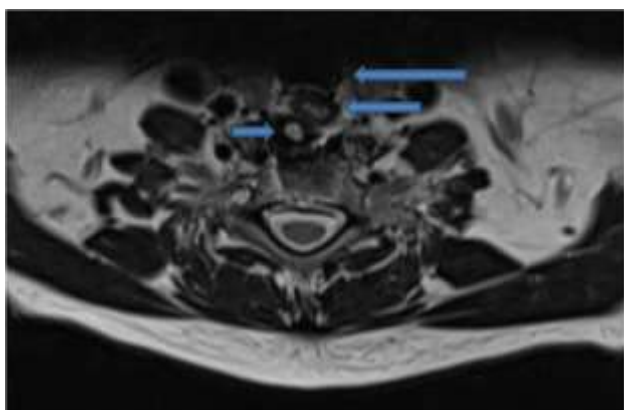
**Figure 1: Axial contrast enhanced CT of the chest.**

The oesophagus (wide arrow) merges with ill-defined prevertebral soft tissue (thin arrow). These appearances are concerning for an oesophageal mass with an extraluminal component.



**Figure 2: Sagittal MIP of the PET study.**

This clearly shows marked FDG activity in the C5/6 disc space which is confluent with FDG activity in the prevertebral space. This is consistent with tracking inflammation.



**Figure 3: T2 weighted axial MRI sequence.**

This was performed following the PET-CT study to confirm the diagnosis. The oesophagus (mid length arrow) lies behind the trachea (long arrow). In the prevertebral space there is an area of high T2 signal surrounded by low T2 signal (short arrow) which is clearly separable for the adjacent oesophagus and is consistent with a small collection with surrounding inflammatory change. This has become better delineated in the interim since the diagnostic CT.

## DISCUSSION

The aetiology behind late infection after spinal instrumentation is still not very clear. Some propose that symptoms are caused by mechanical and metal irritation at the surgical site. On the other hand, many believe it's mainly due to chronic bacterial infection.<sup>10</sup> Our case report supports the notion that chronic infection due to pyogenic bacteria such as *Propionibacterium Acnes* play a major role in contributing to late infection of spinal implants. Although implants are designed to have smooth surfaces to reduce bacterial adherence during operation, *P. acnes* and other low-virulent skin flora create a glycocalyx biofilm which facilitate adherence on the surface of implants.<sup>3</sup> Other causes of late infection have been attributed to haematogenous seeding of bacteria from other surgical site, late infections associated with oesophageal perforation, implant migration and Zenker's diverticulum perforation.<sup>2-5,11,12</sup>

Our case presented with a small non-tender swelling and mild dysphagia. There were no neck pain, fever, malaise, discharging wound. Blood test showed normal inflammatory markers. Initial US and CT scans were suspicious for malignancy. The diagnosis of late infection was extremely challenging. The turning point was the suggestion to perform PET-CT and then the findings picked up by the same astute consultant radiologist (B.S). Christiano et al reported late infection in a 54-year-old female 2 years after an ACDF. The patient presented with complete inability to swallow, temperature of 38°C, ESR of 32, and CRP of 91.<sup>13</sup> Another case report of a 30 years old man presented 3 years after ACSS complaining of 4 months discharging sinus over the posterior triangle of neck, fever, ESR of 45 and high CRP.<sup>14</sup>

Dysphagia in the acute postoperative period is very common and it has been described as an inevitable condition rather than complication after ACSS.<sup>1,9</sup> However, late significant dysphagia should be investigated without delay as it may herald life threatening conditions like oesophageal perforation. In our case, dysphagia was not severe which contributed to late infection being more difficult to diagnose especially in the absence of other clinical symptoms and signs.

Radiological imaging is essential in confirming the diagnosis and detecting the associated underlying conditions mentioned above. MRI gives good sensitivity and is considered the best modality to detect chronic late spinal infections.<sup>15,16</sup> CT scan can still be done but as in our case it may miss small collections and cannot distinguish tumour from inflammatory phlegmons. MRI is superior to CT scan in detecting abnormalities in disc spaces, implant device alteration, neural elements and soft tissue involvement but can often be limited by artefact from surgical implants.<sup>15</sup> In this case PET-CT was found to be superior to both CT and MRI scans in detecting the collection which shifted the inquiry from malignancy to inflammatory condition and spared the patient from further unnecessary procedures. In our case MRI were added only to confirm the finding of the PET-CT.

We agree that the main treatment for late spinal implant infection is the removal of implants.<sup>10,11</sup> In a review of 97 cases with infected spinal implants only 6 did not have the implants removed.<sup>11</sup>

## CONCLUSION

Late cervical infections are rare complication after ACSS. The diagnosis of late infection can be challenging and misleading, due to its ambiguous clinical presentation. Radiological imaging such as PET-CT and MRI are essential in both diagnosis and planning for treatment. The main treatment for infected implant is surgical removal followed by prolonged course of antibiotics.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

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**Cite this article as:** Faury M, Shepherd B, Dare CJ, Sipaul F. Late infection six years post cervical arthroplasty detected following referral to a 2 week-wait head and neck cancer clinic: a case report. *Int J Otorhinolaryngol Head Neck Surg* 2019;5:486-9.