The Journal of Laryngology and Otology
December 1992, Vol. **106**, pp. 1096–1097

Osteomyelitis of the cervical spine following laryngectomy

S. R. Ell, F.R.C.S.,* A. J. Parker, Ch.M., F.R.C.S.,* D. Limb, F.R.C.S.,** R. T. Clegg, F. R.C.S.*

Abstract
Only one case of osteomyelitis of the cervical spine following laryngectomy for carcinoma of the larynx has been reported in the literature to date. We report an unusual case of osteomyelitis of the cervical spine following treatment of laryngeal carcinoma by radiotherapy (RT) and subsequent laryngectomy and discuss the relevant literature.

Case report

A 51-year-old bus driver presented with an eight month history of a hoarse voice and a three month history of shortness of breath. Apart from hypertension treated with atenolol, his past medical history was unremarkable. He smoked 20 cigarettes a day and became short of breath after 15 yards on an incline. Indirect laryngoscopy revealed a tumour of the right vocal fold with reduced mobility. Subsequent direct laryngoscopy and biopsy confirmed a moderately differentiated squamous cell carcinoma (SCC) staged T_2, N_0, M_0. He was treated with 6000 cGy of RT in 25 fractions. One month later his hoarseness deteriorated and he developed discomfort on swallowing. Indirect laryngoscopy revealed oedema of the arytenoids but no ulceration and the vocal folds were mobile. A clinical diagnosis of perichondritis was made and he was admitted for treatment with intravenous cephalexin and metronidazole. There was some improvement but he still had odynophagia and dysphagia. Seven months after RT his right vocal fold was immobile and he had a bovine cough and dental decay. His pain had increased, his dysphagia was worse and on palpation his neck was thick and brawny. The laryngeal biopsy showed findings consistent with RT but no malignant change. In view of his pain and dysphagia, he underwent a total laryngectomy. This was complicated as the tracheo-oesophageal fistula for later insertion of a Gröningen speaking valve developed a 1 cm split and fitting of the prosthesis was not accomplished. Histology of the excised specimen showed there was recurrent SCC present at both sidesof the midline but not extending beyond the thyroid cartilage and that the excision was complete. The post-operative course was initially satisfactory and his pain was abolished until the 12th post-operative day when signs consistent with a minor wound infection were noted. This subsequently improved until the 28th post-operative day when the patient reported dysphagia to solids, but had no pain. A barium swallow showed a smooth mass widening the prevertebral space at the level of C4, 5 and 6 vertebral bodies. On the 35th post-operative day rigid pharyngoscopy proved difficult, due to prominent teeth, neck stiffness and soft tissue fibrosis. The retropharyngeal space was incised with a long sickle knife. No pus or haematoma was found and a microbiological swab cultured mouth commensals only. A nasogastric tube was passed and a second tube was placed into the retropharyngeal space as a drain. The patient improved and was allowed home six days later following the removal of the tubes. One month later (two months post-laryngectomy) he developed increasing pain in the neck but the swallowing had improved. He was treated with appropriate analgesics but was again admitted 12 days later with increasing pain and dysphagia. A barium CT swallow demonstrated barium entering a midline retro-pharyngeal cavity which contained gas and was thought to be a retropharyngeal abscess. There was no abnormality of the cervical vertebral bodies on CT. He remained apyrexial but an occasional peak of 37.5°C was noted. Blood cultures grew a coagulase negative staphylococci sensitive to cephalexin, and a coliform sensitive to metronidazole. He had already been started on these antibiotics and gradually improved to be allowed home two weeks later, continuing with this treatment. Re-admission two weeks later was required (four months post-laryngectomy) because of pain in the neck radiating to the right arm. Restricted neck movements and some pain on swallowing were present. A lateral X-ray of the cervical spine showed loss of definition of the end plates of the fifth and sixth cervical vertebrae, the appearances indicating a discitis and osteomyelitis, with a probable prevertebral abscess. Re-exploration of the neck was undertaken and a remnant of osteomyelitic bone and intervertebral disc from C5/6 was removed and sent for microbiological examination. The vertebrae were fused with bone chips from the iliac crest. Histology of the bone was not requested. A coagulase negative staphylococci and a coliform were cultured from the bone specimen. These were sensitive to flucloxacillin and erythromycin but resistent to penicillin. He was subsequently placed on skull traction for six weeks and treated with flucloxacillin 500 mg four times a day.

Two months later, his painful neck movements were controlled with a cervical collar. A pharyngo-oesophageal stricture was dilated to 39 FG. and he subsquently had several repeat dilations. The pain has since remained controlled by acupuncture. He has good oesophageal speech, and apart from restricted neck movements, is fully recovered.

Discussion

Osteomyelitis, if acute, is a condition characterized by severe pain, extreme muscle spasm, high fevers and rigors; the patient is very ill and the usual organism is a staphylococcus (Anderson, 1982). In this case the symptoms and signs were not so florid. There was no high temperature or rigors and he was not systemically ill. The initial pain and dysphagia was diagnosed as perichondritis with possible residual disease in the larynx after RT. The laryngectomy specimen confirmed the presence of an invasive moderately differentiated SCC. The development of a retro-

From the Department of ENT,* The Royal Hallamshire Hospital, Sheffield and the Department of Orthopaedic Surgery,** St James's Hospital, Leeds.
Accepted for publication: 24 July 1992.

pharyngeal swelling post-laryngectomy is unusual and, associated with local pain and dysphagia, indicated a retropharyngeal abscess or haematoma. However, at incision blood was found, there were no clots or pus. Ordinarily a drain is not used following the incision of a retropharyngeal abscess but in this case a tube was used inserted via the pharyngoscope.

Osteomyelitis of the cervical spine following laryngectomy is an unusual surgical complication. There has been only one case described previously in which the patient suffered tetraplegia complicating mucormycosis of the cervical spine following laryngectomy after RT for carcinoma of the larynx (Buruma *et al.*, 1979). The possible aetiology of the infection was not apparent though he was noted to have had carious teeth. The possibility of metastatic spread from his original disease had to be considered. The irradiation of the cervical spine may have led to osteo-radio-necrosis which could account for the ultimate abnormality (Anderson, 1982). Deep neck abscess and osteomyelitis following tracheoesophageal puncture has been reported (Ruth *et al.*, 1985; Andrews *et al.*, 1987; Diver *et al.*, 1991). In our case the patient did have this procedure performed with the total laryngectomy but the valve could not be inserted. However, the procedure was done using a modified oesophagoscope to protect the back wall of the pharynx making this an unlikely portal of infection. It is not possible to assess the relative importance of all these factors. Plain lateral neck radiographs did not reveal any evidence of bony infection in the early stages of the disease, which is not unusual, however they did not reveal the presence of osteolytic metastases.

Osteomyelitis of the cervical spine is a rare complication of laryngectomy and may be more likely after RT (Anderson, 1982). It may present subacutely, as in this case, making the diagnosis difficult. It should be considered in a patient with refractory pain and dysphagia after laryngectomy. The periosteal reaction in osteomyelitis is most easily detected with a radionucleotide bone scan. This would show the presence of 'hot spots' before any lucency of the bone can be detected by plain radiographs. Ischaemic necrosis without infection would show as 'cold spots'. However, after radiotherapy it would be difficult to distinguish between radiation induced inflammation and active infection. Serum anti-staphyloccocal antibodies can be measured but a negative result does not exclude the presence of infection. The use of fine needle aspiration may provide the diagnosis, however the only certain method is open biopsy of the infected bone as in this case.

Early recognition and treatment is important, and if there is no improvement in the symptoms or the development of root signs, the neck should be explored with an orthopaedic or neurosurgeon. Subsequent treatment consists of flucloxacillin 500 mg four times a day for at least six weeks, depending on the sensitivities of the organisms cultured.

References

Anderson, J. R. (1982) Pyogenic infections of bone. In *Muir's textbook of pathology*. Edward Arnold, London. 876–880.

Andrews, J. C., Mickel, R. A., Hanson, D. G., Monahan, G. P., Ward, P. H. (1987) Major complications following tracheoesophageal puncture for voice rehabilitation. *Laryngoscope*, **97:** 562–567.

Buruma, O. J., Craane, H., Kunst, M. W. (1979) Vertebral osteomyelitis and epidural abscess due to mucormycosis, a case report. *Clinical Neurology and Neurosurgery*, **81 (1):** 39–44.

Diver, J. P., Murty, G. E., Bradley, P. J. (1991) Cervical cord compression complicating tracheo-oesophageal puncture. *Journal of Laryngology and Otology*, **105:** 1082–1083.

Ruth, H., Davies, W. E., Renner, G. (1985) Deep neck abscess after tracheoesophageal puncture and insertion of a voice button prosthesis. *Otolaryngology—Head and neck Surgery*, **93:** 809–811.

Address for correspondence:
S. R. Ell, F.R.C.S.,
ENT Department,
The Royal Hallamshire Hospital,
Glossop Road,
Sheffield, S10 2JF.

Key words: Osteomyelitis; Laryngectomy