Case Report

A 14-year-old male presented with five months of intermittent neck, jaw, right postauricular pain and numbness after a basketball injury. Radiography identified an eccentric, lytic lesion of C2 suspicious for an ABC (Figure 1). Multiple specialists discussed to determine the safest way to treat this lesion. The aggressive C2 mass would require an anterior transoral surgical approach which the neurosurgeon and orthopedic surgeon felt would be virtually impossible. Sclerotherapy was felt to be similarly risky as post-sclerotherapy swelling of the lesion might give further cord compression. A stepwise approach to his care was formulated.

In the interventional radiology suite, the patient underwent cervical angiogram and image-guided C2 biopsy confirming the diagnosis of ABC. Intraoperative induction was performed with propofol, and MEP and SSEP signals remained normal throughout the procedure. The patient was extubated awake, and remained in a hard cervical collar, and was observed in ICU for close respiratory and neurologic monitoring.

One week later, due to concern for cervical instability he underwent partial C2 corpectomy, posterior C1–C3 instrumentation and fusion. For this anesthetic, his hard neck collar remained in situ for a video laryngoscopy and intubation after uneventful intravenous induction. His cervical collar was removed by the surgeon after the patient was repositioned prone. Anesthesia was again maintained with a propofol infusion. Surgeons noted collapse of C2 with compression of the exiting C2 nerve roots. MEP and SSEP signals remained normal throughout the procedure. The patient was extubated awake and moved all extremities to command. To augment the patient’s cervical spine stabilization, a cervical halo vest was placed postoperatively.

In a second procedure, his wide cervical kyphosis was corrected and spacers were placed at C2/C3, C3/C4, and C4/C5 before posterior C1–C3 instrumentation and fusion. However, postoperative imaging showed the vertebral artery was intact. He returned two months later for additional uneventful sclerotherapy because of increased pain (Figure 2).

Three months after his last sclerotherapy treatment, the patient again displayed acute symptoms of spinal cord compression. MRI demonstrated an increase in the size of the cervical lesion up to 7mm (Figure 3). The patient underwent a next-generation resection of his ABC and posterior C1–C3 fusion. For this anesthetic, he was again induced with propofol, satisfactorily intubated with a video laryngoscope, and maintained with a propofol TIVA. Neurosurgeons noted new involvement of C1 and C3, which were also resected. Sclerosant was injected by the surgeons into the residual anterior C2 ABC. He tolerated this procedure well and had an uneventful recovery. A cervical halo vest was applied postoperatively and the patient transitioned to a Miami J cervical collar.

Discussion

Anusural bone cysts are solitary, benign osteolytic lesions. The diagnosis is primarily made radiographically, with an essentially plain radiologic lesion with a characteristic “soap bubble” appearance. MRI findings typically show a nonhomogeneous lesion with low-signal intensity on T1 and T2 imaging. In this case, a biopsy of the lesion was performed to confirm the diagnosis. Treatment options depend on the location and aggressiveness of the lesion. In the rapidly expanding aggressive lesion, conventional treatment options include embolization, surgery with or without adjunct therapy and bone grafting; Percutaneous sclerotherapy and embolization are other treatment alternatives; radiotherapy is no longer considered a potential treatment option because of the risk of malignant transformation. The choice of which therapy to employ often depends on the location of the lesion, size of the lesion, duration of the lesion, which is usually sooner, while sclerotherapy is used on areas which are not easily surgically accessible.

Surgical curettage and bone grafting was initially attempted using the posterior approach towards C2, following embolization of the anterior C2 disease in the interventional radiology suite. Since the aggressive ABC expanded despite surgical treatment and embolization, sclerotherapy was performed. Sclerotherapy would induce initial postprocedure swelling, but it was felt that the potential benefits outweighed the risks, as the patient already had baseline spinal cord impingement and had failed other therapies.

Sclerotherapy for high cervical ABCs is not well described in the literature. Particular risks of sclerotherapy for this aggressive C2 lesion include worsening of spinal cord compression as a result of post-sclerotherapy inflammation and the potential for inadvertent injection of the sclerosant into the vertebral artery, causing entopic stroke and/or death. Vansybre reported similar healing rates for minimally invasive sclerotherapy and intravascular curettage for ABCs in a preliminary study. In their analysis of 94 patients, they concluded that sclerotherapy is safer than intravascular excision in the treatment of ABCs. In their analysis of 17 patients, Dubois concluded that sclerotherapy of ABCs is safe and effective. Further, they stated that sclerotherapy is an important alternative to surgery, especially when surgery is technically impossible or not recommended for high-risk patients.

In this case report, we discuss the anesthetic considerations for a teenager with an aggressive C2 ABC. Fortunately, our patient’s airway was amenable to straightforward laryngoscopy and intubation despite his decreased neck range of motion and limited mouth opening. With his family history of malignant hyperthermia, all potential MTR triggers were eliminated from his anesthetic. He was anesthetized with propofol, isoflurane, and atracurium. Postprocedure radiographs showed the improvement in the size of his C2 ABC after his first sclerotherapy treatments. Despite repeated sclerotherapy treatments, his aggressive C2 ABC continued to grow, and the patient subsequently required an occiput to C5 posterior spine fusion and radical C2 ABC resection with intraoperative sclerosant injected to his remaining ABC.

In surgically inaccessible locations, sclerotherapy has an important role in the treatment of ABCs. We report the anesthetic considerations for this pediatric patient undergoing both minimally invasive sclerotherapy treatments and surgical stabilization for an extraordinarily aggressive C2 ABC.