INTRODUCTION

The retrosigmoid approach is a standard neurosurgical approach for patients with posterior fossa pathologies. Infratentorial tumors, such as vestibular schwannoma and petrous meningioma, can be removed via the retrosigmoid approach and the lateral suboccipital cranial opening. Microvascular decompression (MVD) of the cranial nerves in trigeminal neuralgia or hemifacial spasm is also performed via the retrosigmoid approach, with a small cranial opening (1–2.5 cm) [1,2]. Craniectomy is preferred, especially when the size of the cranial opening is as small as in medium-sized brain tumor resection or MVD, and the residual bone flap after craniotomy is insufficient for cranial closure. Several cranioplasty materials have been used for the reconstruction of skull defects. Polymethyl methacrylate (PMMA), hydroxyapatite, and titanium plates are the most popular commercially available materials. However, these materials carry a high risk of complications, such as infection and implant exposure, especially in patients with large cranial defects [3].

In our institute, various cranioplasty materials have been applied after posterior fossa tumor resection, and PMMA has been used uniformly in patients with neurovascular compression syndrome for more than 5,000 MVD surgeries since 1995 at our institution. Especially, the cranial openings required for MVD are so small that they do not usually cause wound complications. To the best of our knowledge, late wound complications following lateral suboccipital surgery for both tumor
and neurovascular compression syndrome were not reported in the literature.

Herein, we report two cases of patients with late wound complications after lateral suboccipital craniectomy with the same pathophysiology.

CASE REPORT

Case 1
A 50-year-old man visited the outpatient clinic of Samsung Medical Center for wound dehiscence and discharge. He had undergone lateral suboccipital craniectomy and MVD for right hemifacial spasm 4 years prior, without experiencing any residual spasm or complications. PMMA was used for cranioplasty at the end of the surgery. He stated that the surgical wound started to swell a month prior to presentation after sudden neck rotation with a click sound while playing golf. The swelling repeatedly improved and worsened while taking antibiotics, and wound dehiscence with serous discharge developed 3 days before presentation. The wound healed and opened repeatedly, and he was thus scheduled for revision. He had no fever, meningeal irritation signs, or focal neurological deficits. Infection markers, such as white blood cell count and C-reactive protein levels, were within the normal range. Magnetic resonance imaging revealed fluid collection and dural thickening with enhancement at the site of the right suboccipital craniectomy (Fig. 1A). The patient underwent wound revision. A white pus-like liquid was observed, spreading from the muscle layer to the epidural space (Fig. 1B), but no pus was observed in the subdural space. Microorganisms from multiple sites during surgery were not isolated, and the patient was treated with empirical antibiotics for 2 weeks.

Case 2
A 74-year-old man visited the outpatient clinic of Samsung Medical Center for wound dehiscence and discharge. He had undergone lateral suboccipital craniectomy and tumor resection for left vestibular schwannoma 19 years prior, with no newly developed neurological deficits, other than preoperative hearing loss. PMMA was used for cranioplasty at the end of the surgery. The tumor continued to grow during the 9 years of surveillance after surgery, and gamma knife radiosurgery was additionally performed. This patient also experienced a similar initiating event, in which the surgical wound started to swell a month prior to presentation after sudden neck rotation with a click sound while playing golf. As

![Fig. 1. (A) Fluid collection and dural thickening with enhancement at the right lateral suboccipital area (arrow) was observed on gadolinium-enhanced magnetic resonance imaging. (B) White pus-like liquid was observed to spread from the muscle layer to the epidural space during revision surgery.](https://doi.org/10.52662/jksfn.2022.00178)
Late wound complication lateral suboccipital craniectomy

When performing MVD, or when resecting small- to medium-sized tumors. Craniectomy is preferred for small cranial openings because it is safer than craniotomy using a saw, and the remaining bone flap after craniotomy is insufficient for cranial closure. After the main surgical procedure, cranioplasty is performed using various synthetic bone substitutes, such as PMMA, hydroxyapatite, or titanium plate. Cranioplasty using these materials has shown relatively high complication rates in patients with large cranial defects [3]. The wound complication rate of cranioplasty after retrogliomd craniectomy ranged from 1.2–11.4%, depending on the cranioplasty materials used in one study [4]. However, no consistently significant difference in the infection rate was found according to the cranioplasty materials used in other studies [5,6]. We have previously reported the surgical outcomes of our institute, which involved less than 1% of wound dehiscence or infection rates after MVD, with complications only very rarely occurring several years after surgery [7,8].

We encountered two cases of infection several years after lateral suboccipital craniectomy and cranioplasty with PMMA. The probable common mechanism of infections began with scalp detachment from the cranioplasty material after sudden neck movements. Wound swelling from seroma formation improved and worsened repeatedly over several weeks. When wound dehiscence occurs, deep wounds can become exposed and infected. Purulent discharge was observed through the wound opening in both cases. Although the incidence of this complication is very low, our experience indicates that sudden movements that strain the neck muscles can separate the scalp from the cranioplasty material, even if the patient had undergone surgery several years previously. A phenomenon related to the occurrence of late seroma due to possible friction between normal tissue and synthetic materials has been reported in breast augmentation surgery. Differences in the surface characteristics of implants may create variable biocompatibility, and play different roles in late seroma formation [9-11]. As such, further studies are needed to elucidate the relationship between cranioplasty materials and late seroma or infection development. Patients should be informed that wound complications can occur following strenuous activities that involve sudden movement of the neck muscles, even years after surgery.

CONCLUSION

Here, we presented the course of two cases of late seroma with infection that developed several years after lateral suboccipital craniectomy and cranioplasty with PMMA. Sudden neck movement with excessive force was the common cause of the complication, and seroma formation, wound dehiscence, and infection subse-
CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES