Case Report

Pinwheel-Shaped Titanium Plates Should Be Fixed to the Skull Using All Screw Holes to Protect the Plates from Being Bent

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Introduction. In cranioplasty, pinwheel-shaped titanium mini plates are frequently used to cover bone defects produced by burr holes, and it is common to insert screws through only a few of the holes in cranial flap fixation. We report here a case of plate protrusion at an unfixed edge of a pinwheel-shaped titanium mini plate after the patient was hit on the head.

2. Case Presentation

A 69-year-old Asian man noticed a titanium plate penetrating through his scalp in the right temporal region one week prior to visiting our clinic. He had a history of subarachnoid hemorrhage and had undergone clipping surgery of a ruptured middle cerebral artery aneurysm with pterional craniotomy 16 years previously. One month prior to visiting our clinic, he hit his right temporal region on a wall cabinet and noticed something hard bulging subcutaneously at the point of impact. Three weeks after the head trauma, he noticed the plate protruding through his scalp (Figure 1(a)). Three-dimensional computed tomography (3D-CT) scan revealed that part of the titanium plate had been bent and was penetrating the skin (Figure 1(b)). The plate was removed and the skin defect repaired. Figure 1(c) shows the removed plate and the bend in it.

Under general anesthesia, a skin incision was made along the plate to expose it (Figure 2(a)), and then the plate and screws were completely removed (Figure 2(b)). After debridement around the skin defect, a relief skin incision was made 6 cm posterior to the skin defect to suture the defected portion without causing tension, and a skin graft was applied to the relief skin incision portion. Two months after the maneuver, the skin graft had been successfully incorporated without infection.
was made 6 cm posterior to it (Figure 2(c)) to enable suturing of the defect portion without causing tension (Figure 2(d), arrow). The relief skin incision portion was covered with a graft from the outer layer of the skin of the right thigh (Figure 2(e)). Two months later, the skin incision had healed without infection and the skin graft had been successfully incorporated (Figure 2(f)).

3. Discussion

Exposure of a titanium mini plate several months to several years after cranioplasty or facial bone reconstruction is not rare [6–8]. In our case, exposure of the titanium plate was not caused by infection, which is the most frequent cause of plate protrusion [9]. An edge of the patient’s pinwheel-shaped titanium mini plate was bent by relatively minor head trauma, and the upturned part of the plate compressed the scalp, resulting in focal skin ischemia and penetration of the skin. It might be considered that plates utilized for cranioplasty would rarely be bent after being covered by subcutaneous tissue in the absence of infection. However, this case demonstrates that a titanium mini plate can be easily bent by a blow to the scalp directly overlying the plate. Recently, thinner titanium plates (0.3 mm thick) have become more popular for cosmetic reasons [6]. However, the thinner a titanium plate, the easier it would be to bend it. We therefore recommend that screws should be inserted into all holes of pinwheel-shaped titanium mini plates.
Consent

The corresponding author gave the patient informed consent for publication and obtained a written consent form with a signature of the patient.

Conflicts of Interest

All authors have no relevant financial or personal relationships with other individuals or organizations to disclose.

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