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Technical Notes

Wrapping method for better fat handling in endoscopic trans-sphenoidal surgery

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ABSTRACT

Background: Fat is commonly used for preventing cerebrospinal fluid (CSF) leakage during endoscopic trans-sphenoidal surgery (ETSS). However, fat is soft, slippery, and sometimes not easy to handle. The present study aimed to examine the efficacy of our Surgicel® wrapping method, which allows for better fat handling, in preventing the occurrence of CSF leakage among patients undergoing ETSS.

Methods: We used fat tissues removed from the abdomen. The fat was cut with scissors into pieces that were approximately 5 mm in size. Surgicel® was also cut into 2.5 cm². The fat tissues were encased with these Surgicel® squares and slightly moistened with a saline solution.

Results: Between January 2023 and August 2024, 34 patients aged 18–86 years (average 54.9 years) underwent ETSS. Among these patients, 20 had pituitary tumors, 6 had Rathke's cysts, and 8 had other conditions. None of the patients had CSF leakage postoperatively. The use of Surgicel®-wrapped fat during ETSS is better than the use of fat alone.

Conclusion: The Surgicel® wrapping method allows for better fat handling during ETSS.

Keywords: Endoscopic trans-sphenoidal surgery, Fat handling, Surgicel wrap

INTRODUCTION

Endoscopic trans-sphenoidal surgery (ETSS) has been widely performed owing to the recent advancements in endoscopic cameras and technology.^[2] However, cerebrospinal fluid (CSF) leakage, which is one of the ETSS complications, has not yet been resolved.^[12] In general, when CSF leakage occurs during ETSS, fat filling has been reported to be an effective method to manage this adverse event.^[11] However, fat is soft, slippery, and sometimes not easy to handle. In our institution, we address this problem by encasing the fat in Surgicel® for easier handling. Herein, we describe our newly developed technique and its usefulness. We also present a surgical video showing this method.

MATERIALS AND METHODS

We used fat removed from the abdomen. The size of the fat removed depended on the size of the dural opening and the extent of CSF leakage. In our cases, we removed approximately 3 cm² of fat.

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The fat tissues were cut with scissors to approximately 5 mm in size [Figure 1].

Surgicel® was then cut into 2.5 cm² [Figure 2], which was then used to encase the fat [Figure 3]. The Surgicel®-wrapped fat was then slightly moistened with a saline solution [Figure 4]. This process created friction in the fat's surface, making it less slippery and easier to handle [Video 1]. We adjusted the size of the fat graft according to each case.

RESULTS

From January 2023 to August 2024, the Surgicel® wrapping method was performed on 34 patients who underwent ETSS, including 18 male and 16 female patients. The patient's age ranged from 18 to 86 years (average, 54.9 years). Among the 34 patients, 20 had pituitary neuroendocrine tumors, 6 had Rathke's cysts, 1 had a craniopharyngioma, 1 had a chordoma, and 6 had other conditions. The average follow-up period was 7.9 months, and no patient had CSF leakage postoperatively.

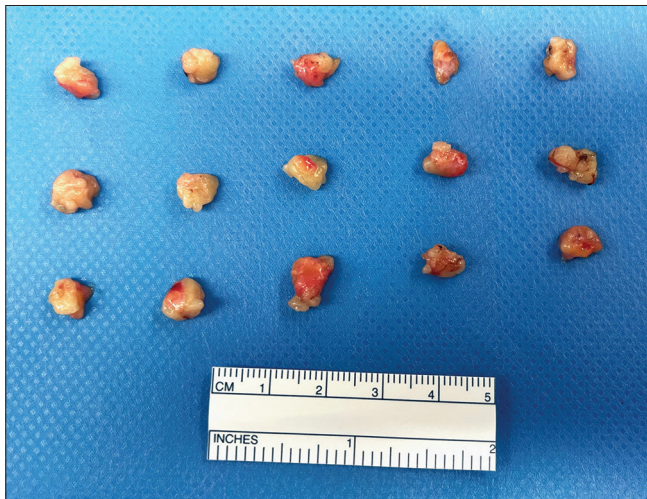


Figure 1: The fat is cut to about 5 mm in size.



Figure 2: Surgicel® is cut into 2.5 cm².

DISCUSSION

We have presented a method of encapsulating fat with Surgicel® and demonstrated its usefulness.

Minimally invasive ETSS has been expanding its application in recent years, not only for pituitary neuroendocrine tumors but also for craniopharyngioma, meningioma, chordoma, and chondrosarcoma, owing to the development of its techniques and instruments,^[6] such as a three-dimension endoscope,^[8] combined exoscope,^[7] or indocyanine green.^[10] However, the risk of CSF is increased with extended ETSS, which involves opening or removing the dura mater with the tumor. Even now, the problem of CSF leakage in ETSS remains unresolved.

Classically, several methods are widely used for preventing CSF leakage, such as fat closure, femoral fascia closure, suturing the dura mater,^[3] nasoseptal flap, and combinations of these methods. Recently, closure with new materials

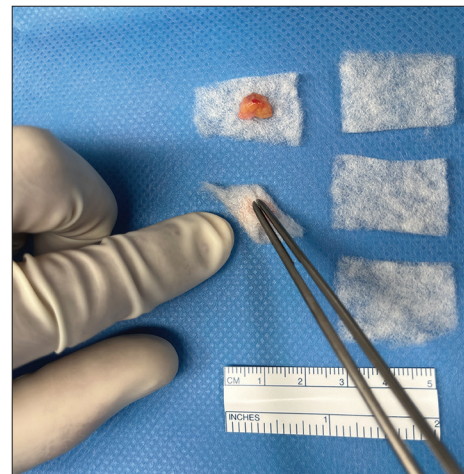
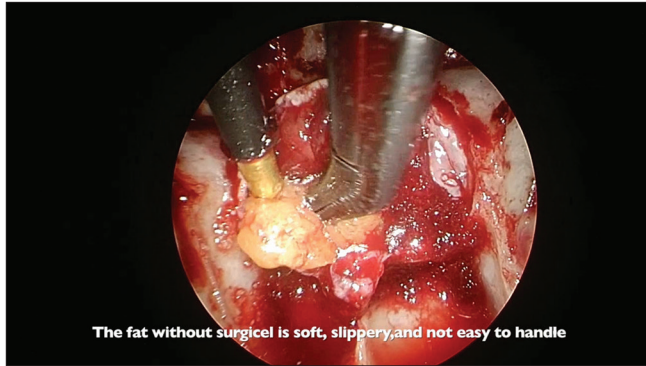


Figure 3: The fat is encased in Surgicel®.



Figure 4: The Surgicel®-wrapped fat was moistened with saline solution.



Video 1: Comparison of using fat alone and Surgicel®-wrapped fat.

such as DuraGen® was reported to be effective.^[9] Among these methods, the fat-filling method is the most widely used because it is autologous tissue, which is less prone to infection,^[5] more versatile, effective, and easy to use.^[1,4]

Fat is slippery and does not easily fit into the implantation site, making it difficult to handle. To solve this problem, we have developed a method of encasing a fat mass in Surgicel®. Surgicel® is fluffy cotton commonly used as a hemostatic agent and cost effective and widely used cost effective in neurosurgery. Wrapping the fat with Surgicel® creates friction on the surface of the fat mass, making it less slippery and much easier to handle. The fat is also shaped into a lump by being encased in Surgicel®, which provides a hemostatic effect. We sometimes fill the fat and then suture the dura mater, but even in this case, the fat fits better, and the suturing becomes easier. In addition, surgeons can adjust the number of fat pieces according to the volume of the extraction cavity since small tumor extraction cavities require fewer pieces, whereas larger cavities require more pieces.

Of course, CSF leakage can be caused by various factors, and it cannot be solved by this method alone. However, the ease of fat handling is considered a significant advantage.

CONCLUSION

The Surgicel® wrapping method is useful to ensure better fat handling during ETSS.

Limitation

The Surgicel® wrapping method led to improved handling of fat tissues during ETSS with a reduced risk of CSF leakage. However, we have not conducted a comparative study involving cases that underwent ETSS with and without Surgicel® wrapping, so there is still a lack of scientific evidence of the efficacy of our technique.

Ethical approval

Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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