

Short Communication

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Image-guided and sialendoscopy-assisted transoral approach for parotid duct stenosis and megaduct

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Abstract

Objective. The aim of this communication was to introduce a novel combined image (magnetic resonance and computed tomography)-guided and sialendoscopy-assisted transoral approach for the treatment of a parotid duct stenosis with megaduct.

Methods. A 46-year-old woman was referred to our department for recurrent infections of the right parotid gland following unsuccessful multiple transoral surgical approaches for a Stensen's duct stricture with megaduct. An image (magnetic resonance and computed tomography)-guided and sialendoscopy-assisted transoral sialodochoplasty was planned and performed.

Results. No complications occurred. The patient was discharged 2 days after surgery. No more swelling or infections occurred. The patient is currently symptom-free after a follow up of 11 months.

Conclusion. Although imaging navigation means more technical effort and costs, this novel approach can be considered a viable surgical opportunity for distal and mid-third parotid duct stenosis with concomitant megaduct, particularly in cases of persistent inflammation or iatrogenic scars due to previous surgery.

Introduction

Salivary duct stenosis occurs most frequently in the parotid gland. When severe, a parotid duct stenosis tends to create a megaduct, defined as a duct dilation exceeding 10 mm.¹ Accurate diagnosis can be made with magnetic resonance sialography, which allows the enhancement of the duct and exact localisation of the stenosis.² In the case of recurrent infections or previous surgery with consequent scarring, the use of a combined image (magnetic resonance and computed tomography (CT))-guided and sialendoscopy-assisted approach can be useful to localise and rehabilitate the stenosis.

The aim of this communication was to introduce a novel combined image (magnetic resonance and CT)-guided and sialendoscopy-assisted transoral approach for the treatment of a parotid duct stenosis with megaduct. A 46-year-old woman was referred to our department for recurrent infections of the right parotid gland following unsuccessful multiple transoral surgical approaches for a Stensen's duct stricture. A magnetic resonance sialography revealed a megaduct (diameter 15 × 23 mm) and a severe distal stricture of the parotid duct; a maxillo-facial CT scan was used to exclude the presence of a salivary stone. An image-guided and sialendoscopy-assisted transoral sialodochoplasty was then planned.

The patient's Digital Imaging and COmmunications in Medicine (DICOM) dataset was uploaded to set up the optical-based navigation system in the operating room. A registration pointer was used to locate the surface points on the skin of the maxilla to obtain an automatic match with the uploaded data. Multiplanar magnetic resonance and CT reconstruction images were displayed in real time on a display to track the navigation pointer (Figure 1a). A circular monopolar incision was made around the parotid papilla and the buccinator muscle fibres were dissected from the distal third of the Stensen's duct. A navigation-guided dissection on the medial surface of the duct was performed (Figure 1b), with subsequent release from the scarred facial soft tissues. Once the stricture was reached, the megaduct was pulled through the incision into the oral cavity (Figure 1c). The duct was incised and dense saliva leaked out. A sialendoscopy was then performed and subsequently the scarred distal duct was excised and its wall sutured to the buccal mucosa. Finally, a 5-French venous catheter was placed as a stent into the ductal opening and secured to the buccal mucosa.

No complications occurred. The patient was discharged 2 days after surgery. The stent was removed one month after surgery. No more swelling or infections occurred. The patient is currently symptom-free after a follow up of 11 months and she has provided her consent to publish this manuscript.



Figure 1. A registration pointer was used to locate the surface points on the skin of the maxilla to obtain an automatic match with the uploaded data. Multiplanar magnetic resonance and computed tomography reconstruction images were displayed in real time on a display to track the navigation pointer (a). After an incision was made around the parotid papilla, a navigation-guided dissection on the medial surface of the duct was performed (b). The stricture and the megaduct were reached through the oral cavity thanks to image-guided assistance (c).

Discussion

Traditionally, treatment of parotid duct stenoses has been challenging,³ with minimally invasive approaches such as interventional sialendoscopy with repeated blind dilation offering only temporary benefit. In such cases, an unavoidable risk is represented by the need for definitive management with parotidectomy. Currently, sialendoscopy allows better visualisation of these stenoses and employs minimally invasive approaches to their management,⁴ but parotidectomy continues to be offered in recurrent cases.

Difficult cases, such as parotid duct stenosis with megaduct secondary to previous surgery or to severe infections or abscesses of the parotid gland, can be treated with the help of an imaging assessment viable in the operating room. This surgical setting has been proven to be effective for the treatment of impacted unpalpable parotid stones, thanks to the development of a CT-guided and sialendoscopy-assisted transfacial approach.^{5,6}

While it is well known that stenosis can be easily and effectively seen with magnetic resonance sialography, we have developed a novel combined approach based on the digital fusion of CT and magnetic resonance imaging (MRI) for the intra-operative navigation of the parotid gland and duct, in this case through a transoral approach for a distal stenosis. A pull-through sialodochoplasty was performed,¹ and the intra-operative navigation helped surgeons during the dissection to reach the exact site of the stenosis in scar tissue secondary to previous surgery, helping to avoid complications such as facial nerve injury thanks to the precise localisation of the dilated parotid duct. The transoral image-guided approach allows the surgeon to reach stenosis of the distal and mid-third part of the parotid duct; it could also be helpful for the treatment of proximal or intraparenchymal parotid duct stenosis by a transfacial approach.⁷ Finally, sialendoscopy allows visualisation and confirmation of the lumen of the duct, and this can be helpful to guide the placement of a salivary stent in the exact position.

This technique could be considered highly effective and beneficial in guiding the surgeon to reach the stenosis in an extremely difficult surgical field. This approach is minimally invasive and compared to a traditional parotidectomy it carries

fewer risks and morbidities, while when compared to simple dilation under interventional sialendoscopy, it potentially allows better outcomes in terms of recurrences. However, the surgical time could be longer because of the set up of the navigation system, with the need for adequate training, in particular at the beginning of this novel surgical experience.

In addition, in patients with dental implants, MRI may not provide precise results because of the artifacts caused by the implants, leading to a less accurate localisation of the stenosis, which could be considered the major contraindication for this approach. Although the cost of this technological setting is generally higher compared to that of a traditional sialodochoplasty, nowadays neuronavigation is widely diffused in head and neck surgical departments, thus leading to a reduction in and optimisation of healthcare costs.

Conclusions

The image (magnetic resonance and CT)-guided and sialendoscopy-assisted transoral approach is a safe and viable option for the treatment of iatrogenic parotid duct stenosis and megaduct. Although imaging navigation means greater technical effort and costs, this image-guided and sialendoscopy-assisted approach appears to be a walkable surgical opportunity for distal and mid-third parotid duct stenosis with concomitant megaduct, especially in the case of patients who have previously undergone surgery for obstructive disorders or with persistent inflammation of tissues surrounding the involved parotid duct.

Uncomplicated parotid duct stenosis can be otherwise managed by means of interventional sialendoscopy or sialendoscopy-assisted surgery according to current published classifications.^{4,8} Although validation on a series of patients is needed, it is our feeling that the combination of image navigation and interventional sialendoscopy will help the surgeon to avoid traditional parotidectomy and related risks in such complex cases.

Acknowledgements. Permission was obtained from the patient for presentation. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national

research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Competing interests. None declared

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