Ultrasound Assessment After External Parotid Sialolithotomy

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ABSTRACT

Sialolithiasis is a rare disease of unknown etiology that affects between 1/10,000-1/300,000 people and about 2% of all sialolithiasis accounts for 70% of these cases. Various modalities have been utilized for the detection of parotid stones and include ultrasound, conventional x-ray, CT scan, sialography, and sialendoscopy, all of which have different sensitivities for detection.1-4 Of these modalities, only sialendoscopy and ultrasound can be used intraoperatively to assess for residual parotid stones after sialendoscopic-assisted or pure open sialolithotomy. Although sialendoscopy is currently the gold-standard for detection of parotid stones, it possesses certain intraoperative limitations for detection of residual pathology.

Ultrasound has been proven to be effective in the pre-operative detection and localization of parotid stones.5 The main focus of this paper is to study the utility of ultrasound in the assessment of the parotid gland in the post-operative setting to help identify residual parotid stones and discuss specific intraoperative findings to identify the presence or absence of sialoliths and guide intraoperative management.

METHODS AND MATERIALS

From August 2009 to January 2012, 11 adult patients with parotid sialolithiasis underwent open sialolithotomy in a tertiary-level hospital setting Pre- and intraoperative post-sialolithotomy ultrasound was performed. Findings included presence of residual stones/fragments and proximal ductal dilatation.

RESULTS

Between August 2009 and August 2012, eleven patients were treated at the George Washington University Hospital using transcervical ultrasound-guided needle localization prior to external sialolithotomy in the operating room. The mean age was 47.2 ± 18.1 (range 23-77) years. Of the 11 patients, 6 (54.5%) were male, and 5 (45.5%) were female. The mean symptom duration was 33.1 (range 1.18-104) months. The presenting symptoms were pain, swelling, discharge, dysphagia, and antral mass in 8 (72.7%), 7 (63.6%), 6 (54.5), 5 (45.5), 4 (36.4%), and 3 (27.3%) of the patients, respectively. Additionally, patients were biofeedback, distal sialolithiasis, occasional calculus formation, moderate calculus formation, and heavy calculus formation that were present in 8 (72.7%), 6 (54.5%), 5 (45.5%), and 3 (27.3%) of the patients, respectively.

Pre-Operative Ultrasound Imaging

One (9.1%) patient displayed retained stones. The retained stone was located in the proximal 1/3 of the duct, 8 mm in size, and was retrieved successfully. 1 (9.1%) patient demonstrated the presence of stones fragments and was successfully explored. 4 (36.4%) patients demonstrated remaining ductal dilation. 9 (81.9%) demonstrated remaining intraglandular dilatation. 1/11 (9.1%) demonstrated hyperechogenic focus in the gland.

Post-Operative Ultrasound Imaging

One (9.1%) patient displayed retained stones. The retained stone was located in the proximal 1/3 of the duct, 8 mm in size, and was retrieved successfully. 1 (9.1%) patient demonstrated the presence of stones fragments and was successfully explored. 4 (36.4%) patients demonstrated remaining ductal dilation. 9 (81.9%) demonstrated remaining intraglandular dilatation. 1/11 (9.1%) demonstrated hyperechogenic focus in the gland.

Post-operative outcomes and long-term follow-up results were obtained. Average follow-up was at 8.9 ± 2.6 (range 6-14) months. All cases were successful to stone removal. 10/11 (90.9%) patients had complete symptom resolution, and 1/11 (9.1%) patient had partial symptom resolution.

The results of our study indicate that ultrasound is reliably able to predict which patients are at risk of having recurrent symptomatic sialolithiasis secondary to residual stones immediately following sialolithotomy. In our series of 11 patients, we accurately identified those patients with residual stones and/or stone fragments and differentiated them from patients with persistent proximal ductal dilation without actual obstruction. Specifically, we found that the presence of hyperechogenic foci with posterior shadowing is the best predictor of the presence of residual stones and the best predictor of success after sialolithotomy. This has been previously reported in the literature by a number of authors who have all described a typical hyperechogenic focus with posterior shadowing to indicate the presence of a stone.6

The appearance of hyperechogenic focus without posterior shadowing is not indicative of the presence of sialoliths and likely represents air bubbles or blood in the ductal system following trauma from surgical exploration. Lastly, the presence of proximal ductal dilation independent of a hyperechogenic focus is also not an accurate indicator of persistent obstruction, and instead is likely related to chronicity of obstruction.

CONCLUSIONS

After cases of ultrasound-guided external parotid sialolithotomy, there is no widely used method to assess for residual stones. As a first, and in a small cohort of patients, we propose that ultrasound accurately identifies the presence of residual calculus in the immediate post-operative period and the presence of hyperechogenic foci with posterior shadowing on US can reliably be used to guide the need for further surgical exploration in patients undergoing sialolithotomy of the parotid gland.

REFERENCES


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Figure 1. Hyperechogenic Foci