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CASE REPORT

Emergency physician point-of-care ultrasound in the diagnosis of sialolithiasis

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Abstract Sialolithiasis is a relatively common diagnosis, with an uncertain etiology, that must be considered in patients presenting with a neck mass. Traditionally, invasive sialography was used to detect salivary stones. Currently, computed tomography has been the test of choice. Ultrasound presents an alternative, rapid, and safe imaging modality for the diagnosis of sialolithiasis. We report a case of sialolithiasis diagnosed by emergency physicians using point-of-care ultrasonography.

Keywords Point-of-care · Sialolithiasis · Ultrasound · Emergency

Introduction

Applications for point-of-care ultrasound in the Emergency Department (ED) are continually expanding. Bedside ultrasound has decreased the need for ionizing radiation in the diagnostic process. We present a case of a neck mass rapidly diagnosed as sialolithiasis in the ED.

Case

A 67-year-old man presented to the ED with left sided neck swelling, increasing over several weeks. There was no difficulty in breathing or rashes reported. The patient did not have localized pain with swallowing. The patient's medical history included hypertension and type II diabetes, for which he took insulin and lisinopril. On examination, the patient had normal vital signs and was in no apparent distress. There was swelling to the left side of the neck, tenderness, mild erythema and left-sided sublingual swelling (Fig. 1). There was no tongue or oropharyngeal edema, uvula deviation, or stridor. Physical examination was otherwise unremarkable.

A focused ultrasound of the jaw and associated structures was performed using a high-frequency linear array transducer. The ultrasound demonstrated a 2 cm submandibular gland stone, inferior and lateral to the mandible (Fig. 2). The diagnosis of sialolithiasis was made and otolaryngology was consulted. The patient's labs demonstrated leukocytosis (14.1 K/μL). Ampicillin/sulbactam IV was given and morphine adequately alleviated the patient's pain. The patient was admitted for IV antibiotics and later underwent a computed tomography (CT) scan to exclude abscess, which confirmed the ultrasound diagnosis (Fig. 3).

Discussion

The definitive cause of sialolithiasis is unknown, however, several theories have been proposed. Symptomatic salivary calculi only cause problems when there is an obstruction of the ductal system [1]. Contributing factors include saliva stagnation, sialadenitis, and ductal inflammation or injury. Salivary calculus composition is mainly calcium phosphate and calcium carbonate, often combined with small proportions of magnesium, zinc, ammonium salts, and organic materials or debris [2].

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Fig. 1 67-year-old male with swelling in the submandibular region diagnosed as sialolithiasis by point-of-care ultrasound

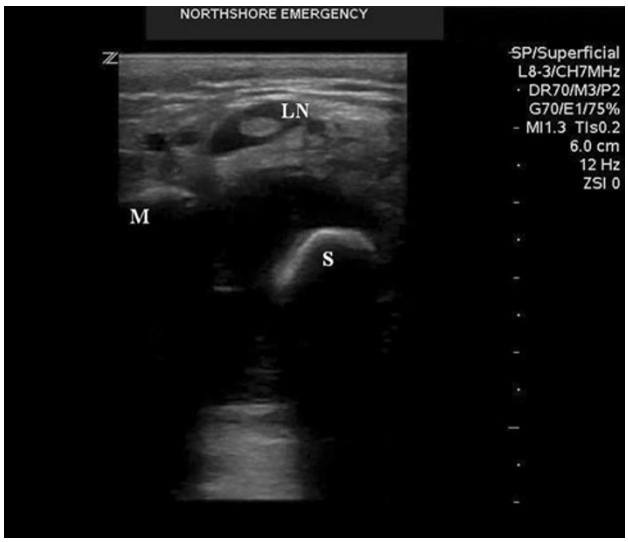

Fig. 2 Gray scale ultrasound image of the left submandibular gland. *S* represents the hyperechoic salivary stone next to the body of the mandible *M*. *LN* lymph node

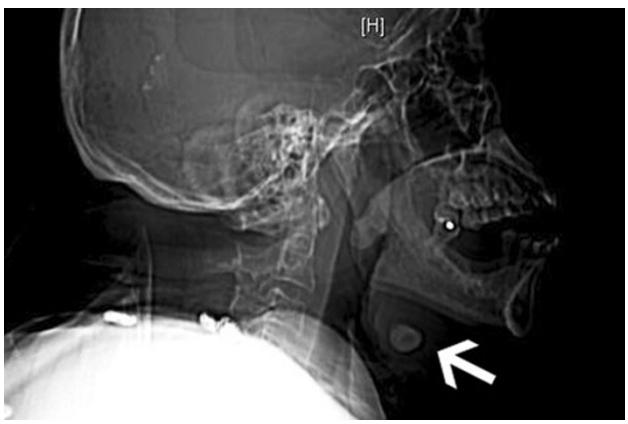

Fig. 3 Computed Tomography scout image demonstrating the sialolith (*white arrow*) in the submandibular space

It is thought that impairment of saliva expulsion contributes to stone formation [3].

Sialolithiasis occurs in 1–2% of the general population and is the most common cause of ductal obstruction and sialoadenitis [4]. Patients are mostly in their fifth to eighth decades of life. Stones occur most commonly in the submandibular gland (80%), 14% of stones are located in the parotid gland, and rarely in the sublingual gland [2]. Symptoms include swelling of a salivary gland and postprandial pain with a remitting/relapsing course. The salivary gland is usually tender to palpation. A palpable stone may be present during the examination.

Radiographs can be used to diagnosis radiopaque stones. However, due to variable calcium content, not all salivary calculi are radiopaque. Traditionally sialography using salivary duct dye injection and X-ray was utilized. Currently, CT scans are often the imaging modality of choice due to their increased sensitivity and resolution of anatomic relationships. One disadvantage of CT includes ionizing radiation which has been associated with increased risk of subsequent malignancy [5]. Magnetic resonance imaging has a limited role for this diagnosis in the ED due to the availability, cost and time.

Ultrasound is a relatively cost-effective modality that is safe. In addition, it is now widely available to emergency clinicians and being used with increasing frequency. Recent studies suggest that ED bedside ultrasound examinations are related to higher patient satisfaction and decreased short-term health care consumption with no major long-term effects [6]. In fact, it has recently been suggested that the failure of emergency physicians to perform point-of-care ultrasound may result in litigation [7].

Ultrasound has been shown to be 90% accurate in the diagnosis of sialolithiasis [8]. High-frequency linear transducers should be utilized to evaluate for hyperechoic stones with posterior shadowing. Stones less than 2 mm in size may fail to shadow [9]. A high-frequency linear transducer was used in our case, but endocavitary transducers have also been used to localize submandibular stones with intraoral probe placement. The sonographer should identify the stone and adjacent structures to avoid mistaking surrounding bony structures as gland stones. In Fig. 2, both the stone and body of the mandible demonstrate posterior shadowing.

Point-of-care ultrasonography has a unique place in emergency medicine. It allows ED physicians to perform, interpret and act upon ultrasound results that are easily obtainable and repeatable. Sonographic real-time dynamic imaging in correlation with patient's signs and symptoms has numerous applications in the ED. Ultrasound is capable in austere environments, in developing countries, battlefields, and space where other types of imaging are impossible.

Rapid diagnosis of large stone sialolithiasis may be useful in decreasing ED length of stay, facilitates early communication with consultants, and most importantly guides to appropriate treatment. This case highlights that ED point-of-care ultrasound allows for the rapid and accurate diagnosis of sialolithiasis and in the future could help avoid the ionizing radiation of a CT scan.

Conflict of interest None.

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