

COMBINED MAGNETIC RESONANCE SIALOGRAPHY AND NON CONTRAST COMPUTED TOMOGRAPHY IN PREOPERATIVE EVALUATION OF SALIVARY GLAND STONES

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INTRODUCTION

The salivary glands are exocrine glands that create, modify, and secrete saliva into the oral cavity. Saliva accelerates mastication, swallowing, and speech, lubricates the oral mucosa, important for taste perception, and digestion of triglycerides and starches. Moreover, saliva plays a defensive role against infections, and protect the oral cavity and esophagus from gastric juice. Sialolithiasis is a benign condition including the formation of stones within the ducts of the major salivary glands, and it is the most recurrent cause of salivary gland swelling. NCCT scan is an excellent tool in the diagnosis and treatment planning of sialolith and painful pathologies of the salivary gland. MRI Sialography is an increasingly popular diagnostic technique in which the patient's own saliva is used as a natural contrast agent. It is a non-irradiating non-invasive imaging modality for the assessment of ductal pathologies. Sialendoscopy is a safe and effective alternative to conventional open surgical techniques with a better quality of life.

AIM OF THE WORK

This study was conducted to fulfill the following objectives:
General objective: To improve the quality of care provided for patients complaining from symptoms of sialolithiasis and sialadenitis.
Specific objectives: The aim of this work was directed to study the value of combined MRI sialography and NCCT salivary glands in patients suspected of having salivary gland stones.

PATIENTS AND METHODS

Patients: The current study was carried out on a sample size of 60 patients, presenting with signs or symptoms suggestive of sialolithiasis.
Methods:
Study design: Prospective experimental study design was selected.
Data collection method and tool: Introduction of a new diagnostic technique of combined NCCT salivary glands with MRI and MRS, in patients with suspected salivary gland's stones, and compare it to the operative data as the gold standard.

- NCCT using a CT system (Siemens, SOMATOM go. Up). Axial images of 0.7 mm thickness used for assessment of the number, location, size and shape of sialoliths.
- MRI using 1.5-T MR imaging system (Achieva, Philips Medical Systems). The following protocols were followed:
 - Screening patients for possible contraindications.
 - Removal of metallic objects.
 - Sixteen channel sense neurovascular head and neck coil was used.
 - The following sequences:
 - *Axial T2-weighted images: The section thickness was 4 mm.
 - *STIR sequence.
 - *MRS: High resolution T2 3D DRIVE was utilized. The images were acquired in the axial plane and reconstructions were viewed in axial, sagittal and coronal planes on the workstation.

RESULTS

Table 1: Agreement (sensitivity, specificity, and accuracy) for CT Stones (n=98)

Detection of stones	Postoperative (n=98)				Sensitivity	Specificity	PPV	NPV	Accuracy
	No (n=5)		Yes (n=93)						
	No.	%	No.	%					
CT									
No	5	100.0	2	2.2	97.85%	100.0%	100.0%	71.43%	97.96%
Yes	0	0.0	91	97.8					
c ² (FEP)	68.495* (<0.001*)								

Table 2: Agreement (sensitivity, specificity, and accuracy) for MRI Stones (n=99)

Detection of stones	Postoperative (n=99)				Sensitivity	Specificity	PPV	NPV	Accuracy
	No (n=6)		Yes (n=93)						
	No.	%	No.	%					
MRI									
No	5	83.3	19	20.4	79.57%	83.33%	98.67%	20.83%	79.80%
Yes	1	16.7	74	79.6					
c ² (FEP)	12.143* (0.003*)								

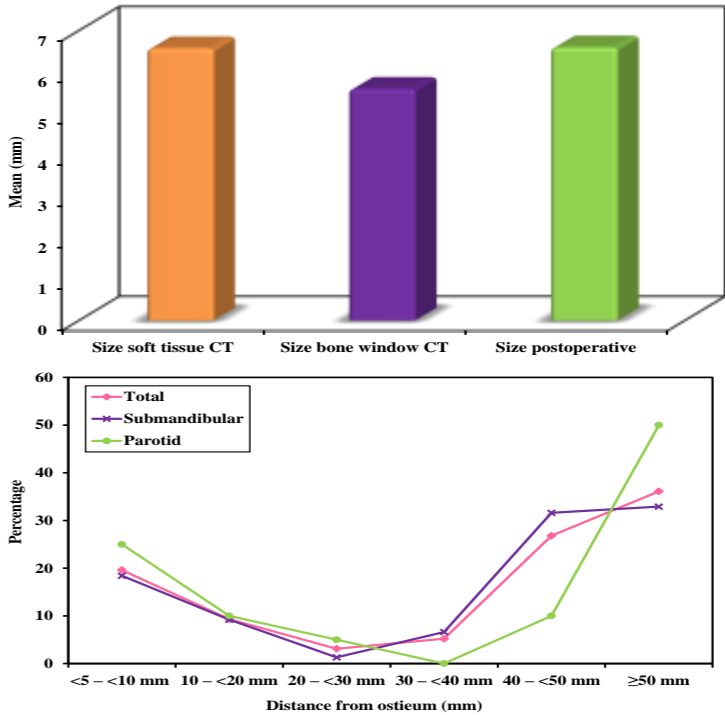


Fig.1: Descriptive analysis of the studied stones according to their size on soft tissue window CT, bone window CT and after post-operative extraction (mm).

Fig.2: Descriptive analysis of the studied stones on MRI according to distance from ostium (mm) in total.

CONCLUSION

The combined protocol proved to be a valuable tool for preoperative planning of procedures in patients with ductal pathology, notably with the advent of sialendoscopy and the increasing demand of minimally invasive procedures in management of salivary gland ductal pathology. The protocol accurately detected ductal sialoliths, obstruction, polyps, strictures, sialoceles and chronic inflammatory changes, thus can obviate the need for diagnostic sialendoscopy. NCCT was fast and more superior in terms of stone detection, shape, and size with high sensitivity and specificity. MRI sialography protocol provided detailed ductal mapping and allowed for detailed assessment of ductal diameter, location, and extent of the ductal pathology.