

# Lund -Mackay staging for rhinosinusitis, correlation between computed tomography scan score and intraoperative findings

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## Abstract

**Objective:** We have conducted this study to evaluate the accuracy of Lund – Mackay scoring system for rhinosinusitis with regards to time lag between dates of both CT scan and operation. **Methods:** A total of 120 rhinosinusitis patients, divided into three groups according to time lag between date of performing sinuses CT scan and date of surgery. Group A, the time lag was more than 8 weeks, in group B the time lag was 2-8 weeks, and group C, the time lag was less than two weeks. All patients underwent endoscopic sinus surgery; rhinosinusitis was staged using Lund – Mackay system and compared intraoperative findings using the same scoring system. **Results:** There was a significant difference in staging score in group A, and in group B although the difference was not statistically significant, it was scientifically noticed, in group C there was no difference between the preoperative and intraoperative scores. **Conclusion:** The correlation between Lund – Mackay staging and intraoperative finding in endoscopic sinus surgery depends on the time lag between scan date and surgery date, the shorter the time lag the better the correlation.

**Keywords:** Computed Tomography, Lund-Mackay, Paranasal Sinuses, Rhinosinusitis, Staging.

## Introduction

Although the impact of chronic rhinosinusitis on the quality of life is proven, we have failed to recognize the best treatment modality to achieve best outcome, and this failure is a reflection of the lack of evidence regarding its pathogenesis [1], and although paranasal sinuses computed tomography scan is a prerequisite for endoscopic surgery., there are controversies regarding the best staging system to adopt for the evaluation of patients with regards to symptoms score and possible outcome of surgery [2,3]. There are many published staging systems like Levine and May staging system, Harvard staging system, Kennedy staging system, and Lund – Mackay system [4]. The last one is the most commonly used one worldwide. The Lund-Mackay staging system scores each sinus [anterior ethmoids, posterior ethmoids, maxillary, frontal, and sphenoid sinuses] according to the following scale: 0 [no opacification], 1 [partial opacification], or 2 [complete opacification]. The ostiomeatal complex is scored as 0 [not occluded] or 2 [occluded]. Left and right sides are

staged separately and the scores are summed so that the total score range from 0 to 24 for each patient [5]. In this study, we have compared the preoperative Lund – Mackay score with the intra-operative findings taking into consideration the time lag between computed tomography scan date and the date of surgery.

## Patients and Methods

This is a prospective study, a total of 120 patients aged 16 to 68 years were included in this study, which was conducted from June 2014 till May 2015, patients consent and ethical committee approval of our institution were granted. All patients were scheduled to undergo endoscopic sinus surgery for medically refractory chronic rhinosinusitis.

All of the patients met the clinical criteria for the diagnosis of chronic rhinosinusitis, exclusion criteria includes orbital or intracranial complications of rhinosinusitis, previous sinus surgery, and history of systemic steroids use after CT imaging.

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All patients underwent CT scan of paranasal sinuses in the axial, coronal, and sagittal planes, and then CT scans were studied and staged according to the Lund – Mackay staging system along with the standard demographic data. Staging was performed by two rhinologists.

Patients were divided into three groups according to the time lag between performing the computed tomography scan and date of surgery. Group A, the time lag was more than 8 weeks, in group B the time lag was 2-8

weeks, and group C, the time lag was less than two weeks.

All patients underwent endoscopic sinus surgery; surgeries were performed by two surgeons who are familiar with the Lund – Mackay system.

SPSS for Windows was used for statistical analysis, using t-test and chi-squared tests when appropriate. All data are expressed as the mean ± standard deviation (S.D.). A value of P<0.05 was considered statistically significant.

**Results**

Our study groups were comparable for age, gender [p > 0.05]. Group A composed of 22 [55%] male patient and 18 [45%] females, the mean age was 38.3 ± 11.3 years. Group B was composed of 19 [48%] male patients and 21 [52%] females with the mean age was 36.5 ± 12.1 years, and group C was composed of 20 male [50%] and 20 female [50%] with mean age of 36.1 ± 13.3 [table 1].

Preoperative staging of group A had a mean of 17.96 and a standard deviation of 4.21 while intraoperative staging had a mean of 14.20 and a standard deviation of 5.00, the p value using paired t-test was 0.0004 and this result showed that the difference is statistically significant. Group B, the preoperative staging had a mean of 18.8 and a standard deviation of 3.62, and intraoperative staging had a mean of 17.40 with standard deviation of 3.25, p value of 0.069 which is statistically not significant but considered scientifically significant. While in group C, the preoperative staging had a mean of 17.30 with 3.71 as standard deviation and the intraoperative staging mean was 17.1 with 3.61 as standard deviation, and the p value was 0.83, and this means that there was no difference between preoperative and intraoperative staging.

**Table 1: Demographic data of our study groups**

Parameter	Group A	Group B	Group C
Age (mean)± S.D. (years)	38.3± 11.3	36.5 ± 12.1	36.1 ± 13.3
Sex (M:F)	19 : 21	19 : 21	20 : 20
<b>Total</b>	<b>40</b>	<b>40</b>	<b>40</b>

**Table 2: analysis data of the study groups**

	Group A		Group B		Group C	
	Preop.	Intraop.	Preop.	Intraop.	Preop.	Intraop.
Mean	17.96	14.20	18.80	17.40	17.3	17.1
Standard	4.21	5.03	3.62	3.20	3.71	3.60
Total No.	40		40		40	
P value	0.0004		0.069		0.83	

**Discussion**

First, we want to emphasize that chronic rhinosinusitis is a clinical diagnosis, that there are benefits from endoscopic surgery [6,7]. There is a general agreement that computed tomography scan has high sensitivity for detection of mucosal inflammation in the paranasal sinuses [8]. And that computed tomography scan of paranasal sinuses is the gold standard imaging modality

for the evaluation of patients with chronic rhinosinusitis. In addition to confirmation of diagnosis, it evaluates the extent of the disease, gives idea about the bony walls, orbit, and skull base; it helps to plan the surgery. Staging of rhinosinusitis help surgeons to plan the surgery, the sinuses need to be opened, the operative time needed, and the expected improvement on patient

condition. Lund – Mackay score system is one of the most popular staging systems, it was evaluated in many aspects, linked to patients symptoms score [9] and evaluated with regards to incidence of intra-operative bleeding [10].Correlations between preoperative symptoms score and Lund – Mackay score were studied and had found that there was no correlation between them [11,12]. While others had found a correlation [13,14] .Others had found correlation between computed tomography scan score and post operative improvement in symptoms [15].

In our practice, we use Lund – Mackay system for the evaluation of our patients, and we had noticed that the extent of disease we expect to find during surgery does not correlate with the preoperative expectations based on Lund – Mackay score, and that’s why we had evaluated the time lag between the scan and the date of surgery, and we are the first to do this.

We think that this is not a defect in this scoring system, but it is an important aspect that should be considered when surgeons use this system. Our finding that the correlation between Lund – Mackay score and intraoperative findings decreases with increased time lag between date of scan and date of surgery. Our study has limitations, of which is the effect of other co morbidities, effect of medications used in the time lag, and whether scans had been done after medical therapy or not. The new staging using volumetric scoring was found to have higher degree of correlation with regard to surgery outcome than Lund-Mackay system [16].

## Conclusion

The correlation between Lund – Mackay staging and intraoperative finding in endoscopic sinus surgery depends on the time lag between scan date and surgery date, the shorter the time lag the better the correlation.

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**Permission of IRB:** Yes

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