

## Incidental Findings in CT scan in Pediatric Populations with Head Injury

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### ABSTRACT

**Objective:** To investigate the incidental findings in computed tomography scans performed for mild head injury in pediatric patients at Nepalgunj Medical College and Teaching Hospital, Kohalpur, Banke, Nepal.

**Materials and methods:** It is a cross sectional hospital based study performed on two hundred and eighteen patients of age < 18 years presenting with mild head injury with no known neurological problem, recent surgery, and time of scanning < 24 hrs of sustaining injury were included in the study between Dec 2016 and June 2017.

**Results:** Among the 218 patients, 134 were males and 84 females, age ranged from 3 months to 18 years. 196 out of 218 patients (89.9%) had incidental findings in CT scan images with greater than 2 incidental findings present in 54 patients. Sinus opacification was the most common incidental finding noted in 86 cases (43.9 %) followed by calcified granuloma in 27 cases (13.8 %). Incidental findings unrelated to trauma which required further investigation was present in 5 cases.

**Conclusion:** Incidental findings are being increasingly encountered in computed tomography scan performed for mild head injury in pediatric age group with sinus opacification as the most common finding. Recognition of these findings and communication with the treating physician is helpful in the overall management of such cases.

**Keywords:** *Computed tomography; sinus; granuloma; head injury; radiation*

### INTRODUCTION

Computed tomography is the first line of investigation in evaluation of patients sustaining head injury. Due to ongoing advances in the resolution of recent scanners, significant incidental findings are commonly encountered which are not related to the trauma. Recognition of these incidental findings and communication to the treating physician is detrimental as it may affect the overall management of traumatic cases<sup>1</sup>. In this study, we studied the incidental findings noted in computed tomography performed in pediatric patient who have presented with mild head injury.

### MATERIALS AND METHODS

A total of 248 pediatric patients who had undergone a computed tomography scan for mild brain injury during the

period Dec 2016 to June 2017 at Nepalgunj Medical College Teaching Hospital, Kohalpur, Nepal were included in the study. Pediatric non-contrast head CT studies were performed using a CT scanner (Revolution EVO; GE Healthcare, Waukesha, WI, USA). All patients with age less than 18 years were included in the study. Patients with known neurological problem, recent surgeries, time of scanning > 24 hrs of sustaining injury, physiological intracranial calcifications, and motion artifact were excluded from the study. All images were interpreted by a single radiologist with experience in body imaging. All data were collected and statistical analysis was done in SPSS 16.0 (Chicago, Illinois).

### RESULTS

Of 248 patients, only a total of 218 patients fulfilled the inclusion criteria for our study. Among the 218 patients, there were 134 males and 84 females with male: female ratio being 1.6: 1. Age of the patient ranged from 1 year to 18 years with mean age of 10.78 ± 5.15 years SD.

Among the 218 patients, 196 patients (89.9%) had incidental findings on CT scan images while 22 patients had either normal or intracranial injuries. Single incidental finding was noted in 142 CT scan images while 54 patients (27.6%) had 2 or more incidental findings as tabulated in Table 1.

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**Table: 1**

Sinus opacification was the most common incidental findings noted in 86 cases followed by calcified granuloma in 27 cases. The incidental findings noted in CT scan and their relative frequency are tabulated in Table 2.

CT findings noted in CT scans done in pediatric mild brain injury		
	Number of cases	Frequency
Normal	6 cases	2.8%
Intracranial injuries including skull fractures	16 cases	7.3 %
Incidental findings	196 cases	89.9%
Single	142 cases	
2 or >2	54 cases	
<b>Total</b>	218 cases	

**Table: 2**

Frequency of incidental findings noted in CT scan			
	Incidental findings	Number of cases	Frequency
1	Sinus opacification	86	43.9%
2	Calcified granulomas	27	13.8%
3	Nasal septal deviation	23	11.7%
4	Adenoid hypertrophy	17	8.7%
5	Falx calcification	16	8.2%
6	Benign enlargement of subarachnoid space (BESS)	4	2.0%
7	Mega cisterna magna	7	3.6%
8	Concha bullosa	14	7.1%
9	Closed lip schizencephaly	1	0.5%
10	Glioma	2	1.0%
11	Meningioma	1	0.5%
12	Cavernoma and AVMs	2	1.0%

More than one incidental findings were noted in some cases.

## DISCUSSION

Computed tomography is the foremost modality of choice in investigating pediatric patients having sustained mild traumatic brain injury. Recent advances in the technology have resulted in better resolution of images with more diagnostic significance<sup>1</sup>. However, it should be noted that use of computed tomography has exponentially increased in recent times with thus a necessity to segregate cases deemed necessary with a note to potential risk of radiation. Recent scanners have resulted in better diagnostic capabilities with minute details thus improving overall management of cases. A significant number of incidental findings have however been noted not relevant to the head injury. Recognition of these incidental findings and communication with the treating physician is necessary for proper management of such cases<sup>2-4</sup>. Although various studies have been done evaluating CT and MRI images in adult mild traumatic pediatric injury, very few

studies have been done on incidental findings on computed tomography scan performed for head injury in pediatric population. Incidental findings were noted in 89.9 % cases in our study which was higher than most other studies where sinusitis and mastoid infection were excluded as incidental study. In our study, sinus opacification was the most common incidental finding noted which is in keeping with previous studies<sup>1,3</sup>. In our study, sinus opacification was noted in 43.9 % of the total cases whereas similar study done previously had 83.9 % of the cases<sup>3</sup>. Presence of sinus opacification in sinus other than the frontal sinus is commonly encountered and thus a clinical correlation is warranted in treating patients as suggested by various studies thus avoiding unnecessary antibiotic administration<sup>3,4,5</sup>.

Calcified granuloma was the second most common incidental findings noted which is significantly higher than the other previous studies. This difference could be related to the endemecity of granulomatous disease in this part of the world<sup>6,7</sup>.

Incidental findings requiring further investigation unrelated to the trauma were noted in only five cases which were in keeping with previous studies<sup>6</sup>. Study have demonstrated that clinically important traumatic brain injuries (ctTBI) in children having undergone CT examination occurred in only 0.9 % cases with only 0.1% required neurosurgery. Our study also demonstrates the very low yield of clinically significant traumatic brain injuries in CT performed in pediatric head injury thus obviating the need. However, thorough and detailed clinical examination with early recognition and diagnosis of ctTBI is detrimental for a timely management of these cases<sup>3,8</sup>.

## CONCLUSION

Incidental findings are common in computed tomography scans performed for mild brain injury in pediatric patient with sinus opacification constituting most of the cases. Recognition of incidental findings and timely communication with concerned treating physicians is pivotal in management of such cases.

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