

Association between radiologic finding of empty sellaturcica and idiopathic intracranial hypertension

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Abstract- The definition of Empty sella syndrome encompasses subarachnoid space herniation toward the sellaturcica by passing through the diaphragm of the sellaturcica and it is frequently associated with flattening of the pituitary gland to certain extent or non-visualization of the pituitary gland. The empty sella has been accompanied by raised intracranial pressure (ICP); decrease in volume of pituitary gland; and posteriorly placed optic chiasm. The present study reviewed 3000 cases with chronic headache for radiologic evidence of empty sellaturcica and associated idiopathic intracranial hypertension at Al-Dewaniyah teaching hospital from January 2012 through may 2016. Out of 3000 patients enrolled in the present study, 20 patients only (0.7%) had positive radiologic signs suggestive of empty sella syndrome. Papileodema, confirmed by ophthalmoscopic examination carried out in the ophthalmology department by ophthalmologist, was found in 8 patients (40%). Highly significant association was found between papileodema and intracranial hypertension ($P=0.020$), with an Odds ratio of 18.33 (95% Confidence Interval; 1.51-222.89).

IndexTerms— Despite the rarity of sellaturcica in patients with chronic headache; however significant proportion will have idiopathic intracranial hypertension that needs medical intervention

I. INTRODUCTION

The definition of Empty sella syndrome encompasses subarachnoid space herniation toward the sellaturcica by passing through the diaphragm of the sellaturcica and it is frequently associated with flattening of the pituitary gland to certain extent or non-visualization of the pituitary gland (Rath et al., 2015). The syndrome of empty sella was first described by Busch in 1952 and it was observed that the disease is commonly encountered in adults (Poggi et al., 2014); however, there is some evidence that the disease might be seen in children and particularly associated, in children, with dysfunction of hypothalamo-pituitary axis, diabetes mellitus, diabetes insipidus, nerve deafness and atrophy of optic nerve (DIDMOAD syndrome) (Poggi et al., 2014). Expansion remodeling of the bony elements of the sella is a direct consequence for the transmission of CSF pulsation via herniated subarachnoid space. The empty sella has been accompanied by raised intracranial pressure (ICP); decrease in volume of pituitary gland; and posteriorly placed optic chiasm (Saindaneet al., 2013; Zayouret al., 2006). Despite these associated abnormalities, the empty sellaturcica is regarded as

an incidental finding and may be viewed as a normal variant resulted from a defect in the diaphragm sella (Sage and Blumbergs, 2000). When there is absence of radiation therapy, surgery or medical therapy for an intrasellar mass, this situation has been considered “primary empty sellaturcica” (Sage and Blumbergs, 2000). Pseudotumor cerebri, also called Idiopathic intracranial hypertension (IIH), is a syndrome of unidentified reason that causes an increment in ICP with no evidence of an intracranial mass or obstructed CSF circulation (hydrocephalus) (Friedman and Jacobson, 2002). The majority of patients with IIH suffer from headaches, diplopia, tinnitus, transient visual obscurations and papilledema (Wall, 2010). Improvement of symptoms can be achieved through medical and surgical reduction of CSF pressure; however, if left untreated it may end up with permanent vision loss (Celebisoy et al., 2007). Despite the fact that diagnosis of IIH relies on clinical setting and raised CSF pressure on lumbar puncture in the presence of normal findings in neuroimaging (Friedman and Jacobson, 2002), orbital changes on MRI and CT are frequently observed in patients with IIH. These MRI and CT findings encompass posterior sclera flattening, vertical tortuosity involving optic nerve sheath complex, widening of the perioptic nerve subarachnoid space and enhancement or protrusion of the prelaminar optic nerve (Saindaneet al., 2013). Nonetheless, these findings up on imaging carry poor sensitivity and specificity to be regarded as diagnostic of the reason behind elevated ICP, such as IIH (Agid and Farb, 2006). The empty sellaturcica ranks at the top of imaging sign list in the presence of IIH and possibly is an imaging associate of prolonged raised ICP (Agid and Farb, 2006; Yuh et al., 2000). On MRI, the empty sellaturcica is demonstrated by CSF-intensity signal in the sellar borders and some range of flattening of the upper surface of the pituitary gland and is frequently accompanied by remodeling and widening of bony sellaturcica. A gross morphologic abnormality in the diaphragm sella has been observed in around 50% of adults and the general incidence of an empty sellaturcica on imaging has been considered at 12%. On the contrary, the incidence of IIH is somewhat rare, accounted for approximately 1 case per 100,000 individuals (Saindaneet al., 2013). Subsequently, the majority of patients with an empty sellaturcica on imaging will lack IIH and need no further diagnostic workup for the situation. The objective of the present study was to determine the rate of IIH in a sample

of Iraqi patients with an imaging evidence of an empty sellaturcica.

II. PATIENTS AND METHODS

The current cross sectional study included 3000 patients suffering from chronic headache who were subjected to MRI examination at radiologic unit in Al-Dewaniyah teaching hospital from January 2012 till May 2016. The MRI -reports were reviewed for findings suggestive of empty sellaturcica: the CSF fluid filled sella and infundibulum can be seen traverse space , no pituitary gland seen , increase sellaturcica depth (more than 10mm) , and fundoscopic examination finding suggestive papilledema : involve bilateral disc swelling in various stages of evolution ; pilledema is nearly always bilateral although it may be asymmetrical visual out comes vary according to stage of presentation ...Patients age, gender and neurologic examination findings were included in the questionnaire form. Data were then transferred into a Microsoft

Office Excel sheet and then statistical analysis was carried out using SPSS version 22.0. Numeric data were expressed as mean and standard deviation whereas categorical data were expressed as number and percentage. Chi-square test was used to study association between categorical variables and Odds ratio was used to estimate risk. P-value of less than or equal to 0.05 was considered significant.

III. RESULTS

Out of 3000 patients enrolled in the present study, 20 patients only (0.7%) had positive radiologic signs of suggestive of empty sella syndrome, figure 1. The general characteristics of those patients, with empty sella syndrome, are shown in table 1. Eight patients were males (40%), while 12 patients were females (60%). The age range was 25 to 55 years with a mean of 40.5 years. Papileodema, confirmed by ophthalmoscopic examination carried out in the ophthalmology department by ophthalmologist, was found in 8 patients (40%).

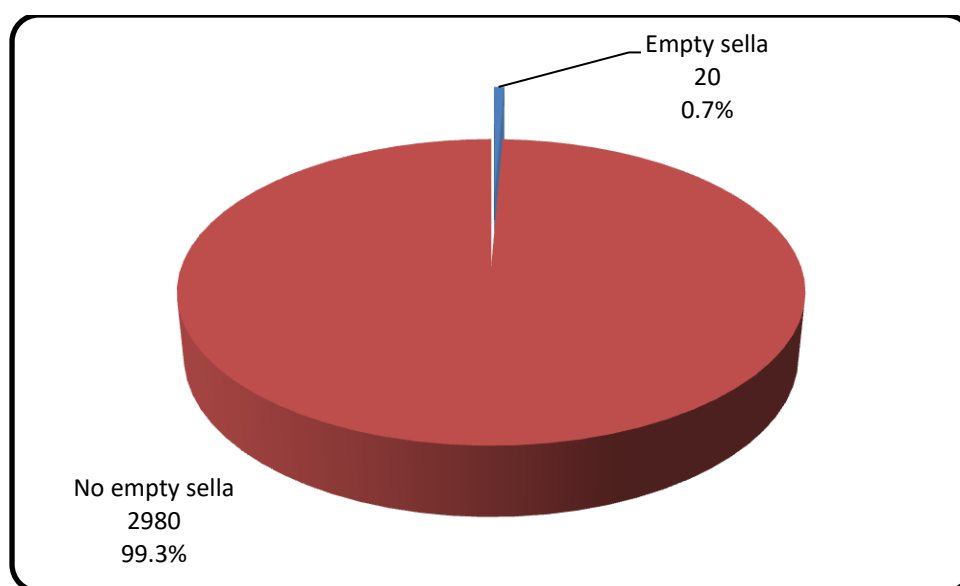


Figure 1: Rate of empty sella in patients with chronic headache

Chi-Square test revealed insignificant association between gender of the patient and positive diagnosis of empty sella ($P=0.638$), table 2. Highly significant association was found between papileodema and intracranial hypertension ($P= 0.020$),

with an Odds ratio of 18.33 (95% Confidence Interval; 1.51-222.89), table 3. Papileodema was proved to be related neither to age of patients nor to their gender ($P>0.05$), tables 4 and 5.

Table 1: Characteristics of patients with empty sella

Characteristic	n (%)
Gender	
Male	8 (40)
Female	12 (60)
Age	
25-35 Y	5 (25)
36-45 Y	9 (45)
46-55 Y	6 (30)
Papileodema	
Positive	8 (40)
Negative	12 (60)
IHT	

Positive	5 (25)
Negative	15 (75)

IHT: idiopathic raised intracranial pressure.

Table 2: Association between positive radiologic finding of empty sella and gender

Empty sella	Male n (%)	Female n (%)	Total n (%)	χ^2	P
Positive	8 (0.76)	12 (0.62)	20 (0.67)	0.221	0.638
Negative	1042 (99.24)	1938 (99.38)	2980 (99.33)		
Total	1050 (100.00)	1950 (100.00)	3000 (100.00)		

Table 3: Association between papiledeema and IHT in patients with empty sella

Papiledeema	IHT			χ^2	P
	Positive	Negative	Total		
Positive	5 (83.33)	3 (21.43)	8 (40.00)	6.706	0.010
Negative	1 (16.67)	11 (78.57)	12 (60.00)		
Total	6 (100.00)	14 (100.00)	20 (100.00)		

Odds ratio=18.33; 95% CI (1.51-222.89)

Table 4: Association between age and papiledeem in patients with empty sella

Papiledeema	Positive	Negative	Total	χ^2	P
25-35	1 (12.5)	4 (33.3)	5 (25.0)	1.157	0.561
36-45	4 (50.0)	5 (41.7)	9 (45.0)		
46-55	3 (37.5)	3 (25.0)	6 (30.0)		
Total	8 (100.0)	12 (100.0)	20 (100.0)		

Table 5: Association between gender and papiledeem in patients with empty sella

Papiledeema	Positive	Negative	Total	χ^2	P
Male	2 (25.0)	6 (50.0)	8 (40.0)	1.250	0.264
Female	6 (75.0)	6 (50.0)	12 (60.0)		
Total	8 (100.0)	12 (100.0)	20 (100.0)		

IV. DISCUSSION

The “empty sella” in medical practice is a term which indicates a range of findings associated with the bony sellaturcica and pituitary gland, varying from some superior concavity of the pituitary gland to evident absence of the gland and CSF widening of the bony borders of the sellaturcica. Due to the general observation of discovering empty sella as an incidental finding added to the diagnosis addressed to patients

with some clinical manifestation related to raised intracranial pressure, it appears wise to advise physicians about which category of patients who need further evaluation and follow up including lumbar puncture and fundoscopic examination.

In the present study we evaluated a sample of patients presented with headache and discovered that a minority of them (0.7%) had empty sella syndrome, proved by radiologic examination. The significance of this finding was disclosed by the evident (40%) rate of raised intracranial pressure following

fundoscopic examination and the significant association between finding papilledema and raised intracranial pressure in those patients ($P < 0.05$). It should be pointed out that headache alone is a poor predictor of empty sella syndrome but when combined with papilledema the sensitivity was markedly increased; so it is very wise to consider physical examination including fundoscopic examination before addressing radiologic evaluation of patients with chronic headache and if possible looking for other suggestive signs. Several studies find association between empty sella and intracranial hypertension in the presence of other signs like younger patient age; increased scalp thickness and neck fat thickness; and presence of headache, visual symptoms, papilledema, and orbital findings (Saindane et al., 2013). Different appearances of empty sellaturcica have been depicted with IIH (Yuh et al., 2000). Some authors described that the IIH group was more likely than the incidental empty sellaturcica group to have one

or more orbital finding of increased perioptic nerve CSF, flattening of the posterior sclera, protrusion of the optic disc, and vertical tortuosity of the intraorbital optic nerve. These orbital findings have been significantly correlated with IIH (Ball et al., 2011); however, according to (Agid et al., 2006) <http://www.ajronline.org/doi/full/10.2214/AJR.12.9013> and Agid and Farb in 2006, flattening of posterior globe is the only sign that highly define the identification of IIH (specificity, 100%; sensitivity, 43.5%; positive likelihood ratio, 49.7). on the other hand some authors found that the most common orbital finding in the incidental empty sellaturcica group was increased CSF surrounding the optic nerve intraorbital segment. The results of this study show, in accordance with several other authors (Agid et al., 2006), that this finding is somewhat nonspecific sign for chronically elevated ICP.

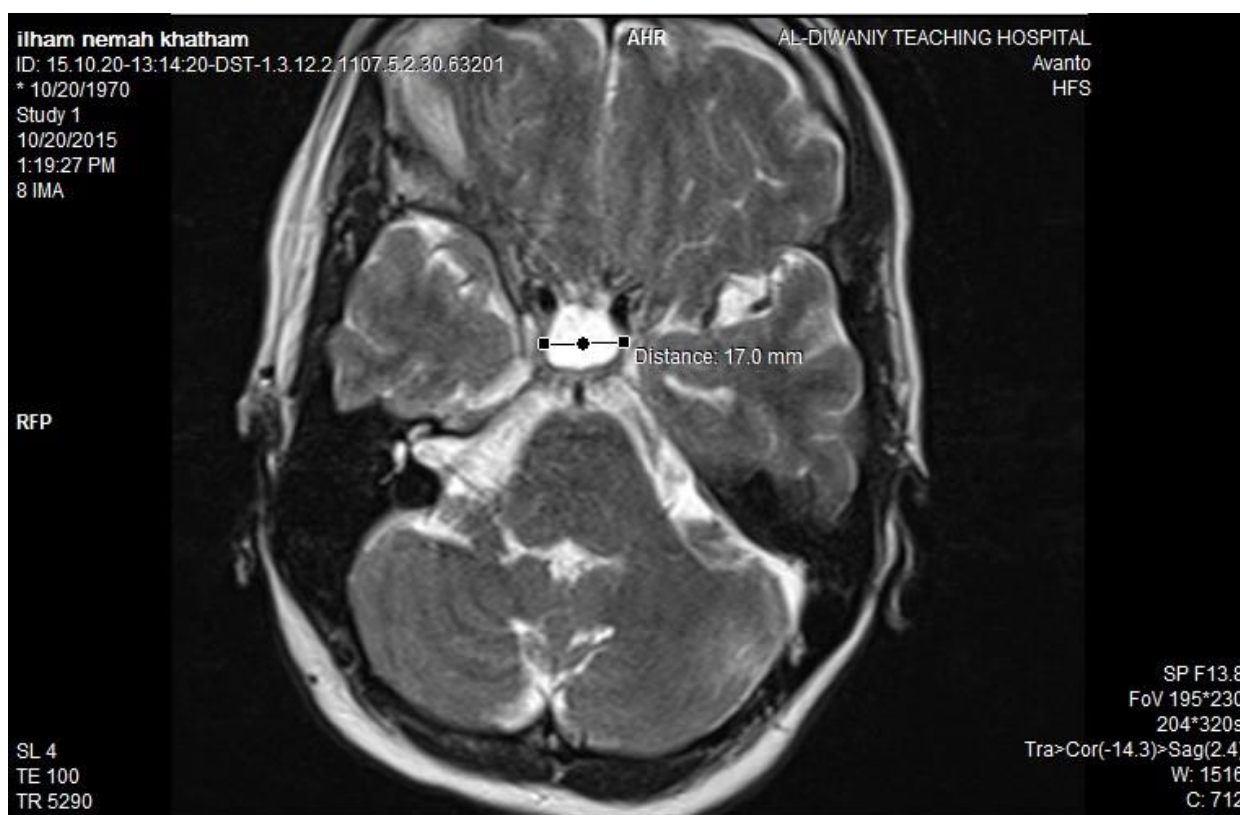


Fig : 1 axial MRI T2 weighted image of brain showing complete filled sell by CSF , no pituitary gland can be detected.



Fig :2 sagittal view MRI T2 weighted image of brain showing enlarge depth of sell (13.1mm) & filled with CFS.

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