IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 7 Ser.5 (July. 2022), PP 05-08
www.iosrjournals.org

MRI Imaging of Partial Empty SELLA

Dr. Anju Dhiman[1] , Dr. Parveen Chandna[2], Dr. Dalip Singh Dhiman[3] ,
Senior Resident[1], Assistant Professor [2] , Professor and HOD[3],
Department of Radio-Diagnosis,
N.C. MEDICAL COLLEGE AND HOSPITAL, ISRANA, PANIPAT, HARYANA , INDIA
Corresponding Author: Dr. Parveen Chandna

Abstract
Empty Sella Syndrome is not a common entity and presents in asymptomatic form but can be considered an occasional finding owing to increased intracranial pressure ; occasionally it is highly severe. Empty Sella Syndrome can be grouped into two types primary and secondary based upon previous history of surgery or signs of irradiation having an impact on the pituitary gland. Primary empty sella arises owing to an inherent weakness of the diaphragma sella associated with an increase in the intracranial pressure which triggers the herniation of arachnoid membrane into the pituitary fossa. The main objective of this paper is to explicitly explain the persistence of the cases related to partial empty sella and discuss the differential diagnosis for deteriorating and pitiable condition of this peculiar disorder. When the pituitary gland shrinks or gets flattened making the same difficult to be observed on the MRI scan revealing an appearance of an empty sella which is termed as empty sella syndrome. In Partial empty sella, a part of the pituitary gland is revealed on the MRI scan. Empty sella (ES) is a condition where the sella turcica (ST) contains considerable volume of cerebro-spinal fluid (CSF) and the pituitary gland is pressed towards the sellar wall with or without enlargement of the sella turcica (ST).

Key words: *Pituitary gland, Empty Sella Syndrome, Empty Sella, Pituitary Dysfunction and Partial Empty Sella.*

Date of Submission: 08-07-2022 Date of Acceptance: 22-07-2022

I. Introduction

Empty sella syndrome is a condition in which the sella turcica contains considerable volume of cerebro-spinal fluid (CSF) .Either the gland was found to be shrunken or crushed and flattened depicting in the form of an empty sella on MRI scan. It has been observed in middle aged women who are quite obese due to sedentary way of life style and hypertensive. An Empty Sella persists owing to herniation of the arachnoid through an incompetent diaphragma sellae. With the passage of time, cerebrospinal fluid (CSF) pulsations may enlarge the sella and push the gland against the floor of the sella. Compression of the pituitary gland may have an adverse effect on normal functioning, or reveal traction on the optic chiasm and nerves which may develop visual symptoms. Although most individuals who have been suffering from primary Empty sella syndrome have been found to be asymptomatic with a few exceptional cases. Middle-aged obese females have been affected more commonly presenting with headache occasionally associated with endocrine or visual abnormalities. [1,2,15,16]

Elaborate studies have revealed that empty sella syndrome may be associated with pituitary dysfunction contrary to the belief of being an incidental finding. [3,6,7]
In this paper , out of a few cases under our consideration ,we have been able to present a patient who visited in our hospital with symptoms of visual disturbance , intermittent headache and not attaining the proper height associated with weight loss. However, owing to its initial findings, various endocrine as well as non-endocrine disorders have been enumerated in association with Empty Sella (ES).[8,17,20,21]

The pituitary gland lies in sella turcica, which is a saddle like compartment at the base of the skull. Individuals with primary Empty Sella Syndrome (ESS) may have high levels of the hormone prolactin, that interferes with the normal functioning of the testicles and ovaries. [12,13]

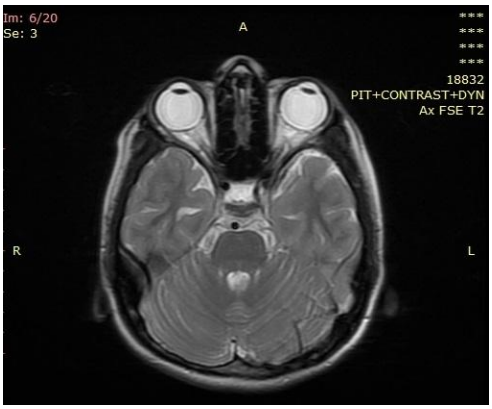
II. Material And Methods:

The study was carried out in the Department of Radio diagnosis, NC MEDICAL COLLEGE and Hospital,Israna ,Panipat. After taking a properly informed written consent, complete history and thorough clinical examination was done and this patient was subjected to MRI scan.

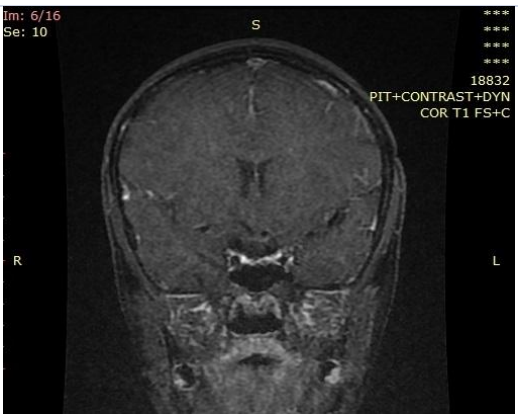
Discussion : Patients with pituitary thickness less than 3mm and more than 50 percent of CSF related to sella turcica have been categorized as COMPLETE EMPTY SELLA . Patients with pituitary thickness more than 3mm and less than 50 percent of CSF related to sella turcica have been categorized as PARTIAL EMPTY SELLA.

III. Case Report:

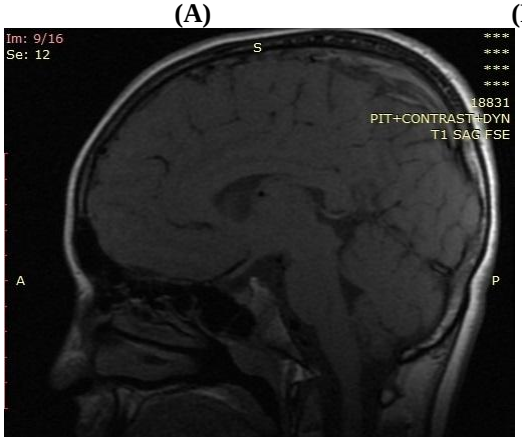
A 14 year old male patient came to pediatrics OPD with symptoms of visual disturbance , **intermittent headache** and not attaining the proper height associated with weight loss. **Cardiovascular and respiratory system examination was found to be normal. Central Nervous system examination was unremarkable too.**



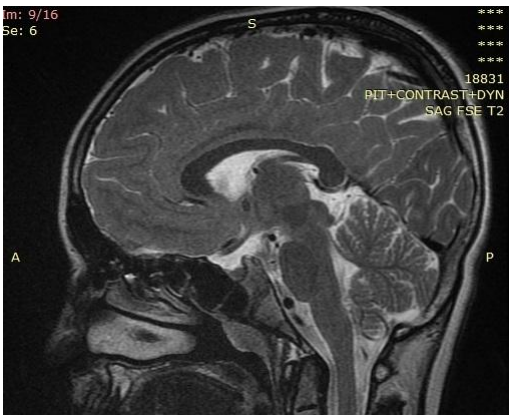
(A)



(B)



(C)



(D)

MRI IMAGES REVEALS: THINNED OUT AND DISPLACED PITUITARY GLAND WITH CSF FLUID IN SELLA S/O PARTIAL EMPTY SELLA.

The sella appears normal in dimension measures approx 9x10mm (CCXAP) and filled with CSF fluid which shows T1 low with T2 and FLAIR bright signals. No restriction diffusion noted .The pituitary gland is thinned out (measures apprx 3.8 mm in thickness) and displaced inferiorly towards sphenoid sinus which appears same as intensity of gray matter.Pituitary stalk is centre. Sella floor is normal. In view of the finding of partial Empty Sella, pituitary hormonal studies were recommended.

In children, Empty Sella Syndrome (ESS) may be the causative agent of early onset of puberty, pituitary tumors, growth hormone deficiency, or pituitary gland dysfunction. Magnetic resonance imaging (MRI) scans have been found to be helpful in evaluating and detecting Empty Sella Syndrome(ESS) and for identifying underlying disorders .[9]Surgical therapy needs not to be required except for a few cases presenting with CSF rhinorrhea or progressive visual loss.[5,14,19]

In Partial empty sella, a part of the pituitary gland is visible on the MRI scan. An Empty Sella occurs owing to herniation of the arachnoid through an incompetent diaphragma sellae. With the passage of time, cerebrospinal fluid (CSF) pulsations may enlarge the sella and push the gland towards the floor of the sella. Compression of the pituitary gland may affect normal functioning, or reveal traction on the optic chiasm and the associated nerves may develop visual symptoms. Middle-aged obese females have been affected more commonly presenting with headache occasionally associated with endocrine or visual abnormalities. [11,12,13]

The term Empty Sella Syndrome (ESS)reveals a distinct radiological and anatomical entity in which the subarachnoid space extends significantly through feeble diaphragma sella into the sella turcica[4,10,18]. There is a small pore for the passage of the infundibulum.

A number of hypotheses have been critically described especially to explain explicitly the cause of primary Empty Sella Syndrome (ESS) such as pituitary apoplexy, pituitary infarction, and rupture of an intrasellar cyst[12,13]. A noticeable explanation is that the pitiable condition appears in a patient who has either a transient or constant elevation in intracranial pressure and who has feeble diaphragm sella that permits the subarachnoid space for its entry into the sella by the hydrostatic pressure and pulsatile movement of CSF[4,10].

Secondary Empty Sella Syndrome (ESS) is normally associated with a previous surgery, radiotherapy, or medical treatment for tumors of the sellar region [4,10,18].In a recent study, Ghatnatti et al.[4] made it clear that Partial Empty Sella(PES)accounted for majority of cases of empty sella and the same have been frequently noticed in females with higher parity .

Ghatnatti et al.[4] also noted endocrine dysfunction in 50% of Partial Empty Sella (PES) patients while De Marinis et al.[13] found endocrine abnormalities in 19%. However , a peculiar hyperprolactinemia had been noticed as the most frequent endocrine abnormality .

Obesity results in obstructive sleep apnea leading to hypercapnia and increased CSF pressure predisposing to empty sella. Clear cut variation in the reported prevalence of endocrine abnormalities in Partial Empty Sella (PES) have been noticed as well. [12,13]

Enlargement of the pituitary during pregnancy may progress along with weakening of the sellar diaphragm, thus predisposing to herniation of cerebrospinal fluid into the sella.[13] Visual disorders followed by CSF rhinorrhea have been detected as the confirmed signs to start surgical process . The type of surgery is linked to clinical presentation and radiological findings. [14,5,19].

IV. Conclusion :

Primary Empty Sella Syndrome (ESS) is more prevalent in obese adult female associated with hypertension. Secondary Empty Sella Syndrome (ESS) can be due to severe suppression of pituitary gland within the cavity following radiation therapy, injury or surgery. Patients with secondary Empty Sella Syndrome(ESS)can reveal unusual symptoms that reflect the loss of pituitary functions, such as the ceasing of menstrual periods, intolerance to stress along with infection, fatigue and infertility. [8,9,10,12,13]

PARTIAL EMPTY SELLA (PES) could be detected due to varying clinical conditions succeding with occasional perseverance of a clinically asymptomatic arachnoid pouch within the sella turcica to trigger on intracranial hypertension and rhinorrhea [6,20].

Emtpy Sella Syndrome is an incidental finding which can be confirmed in a patient who has either a transient or constant elevation of intracranial pressure and who has feeble diaphragm sella that facilitates the subarachnoid space for easy passage into the sella by the hydrostatic pressure and pulsatile movement of CSF. [2,4,16,18].

The infundibulum sign is highly useful in differentiating an empty pituitary sella from a cystic lesion of the pituitary region .MRI is the modality of choice for confirming and establishing the diagnosis, that reveal the sella to be filled with CSF and the infundibulum can be well visualized escaping through the space, thereby excluding a cystic mass. This is mentioned as the infundibulum sign .

The urgent requirement for replacement hormone therapy in partial empty sella (PES), as in other syndromes that may trigger hypopituitarism, should be applicable to every single hormone, including GH. The suspicion of symptomatic intracranial hypertension tends to CSF shunting procedures needed to escape potential severe complications such as blindness.[5,14,19]

Funding : No Funding Sources

Conflict of Interest : None Declared

Ethical approval : The study was approved by the Institutional Ethics Committee

References

[1]. Rani P.R., Maheshwari R., Reddy T.S., Prasad N.R., Reddy P.A. Study of prevalence of endocrine abnormalities in primary empty sella. Indian J Endocrinol Metab. 2013;17(Suppl. 1):S125–S126.

[2]. Melmed S, Kleinberg D, Ho Ken . Pitutary physiology and diagnostic evaluation. In: Kronenberg HM, Melmed S, Polonsky KS, Larsen PR, editors. Williams textbook of endocrinology, Chap 8. 12. Philadelphia: Elsevier; 2011.

[3]. Zagardo M.T., Cail W.S., Kelman S.E., Rothman M.I. Reversible empty sella in idiopathic intracranial hypertension: an indicator of successful therapy? Am J Neuroradiol. 1996;17(10):1953–1956.

[4]. Ghatnatti V., Sarma D., Saikia U. Empty sella syndrome – beyond being an incidental finding. Indian J Endocrinol Metab. 2012;16(Suppl. 2):S321–S323.

[5]. Davis S., Tress B., King J. Primary empty sella syndrome and benign intracranial hypertension. Clin Exp Neurol.1978;15:248–257.

[6]. Kim J.H., Ko J.H., Kim H.W., Ha H.G., Jung C.K. Analysis of empty sella secondary to the brain tumors. J Korean Neurosurg Soc. 2009;46(4):355–359.

[7]. Del Monte P., Foppiani L., Cafferata C., Marugo A., Bernasconi D. Primary "empty sella" in adults: endocrine findings. Endocr J. 2006;53(6):803–809.
[8]. Allen SS, Saxena KM. Empty sella syndrome in adolescent. J Adolesc Health Care. 1986;7(3):198-201.
[9]. Ammar A, Al-Sultan A, Al Mulhim F, Hassan AY. Empty sella syndrome: does it exist in children? J Neurosurg. 1999;91:960–3.
[10]. Degli Uberti EC, Teodori V, Trasforini G, Tamarozzi R, Margutti A, Bianconi M, et al. The empty sella syndrome. Clinical, radiological and endocrinologic analysis in 20 cases. Minerva Endocrinol. 1989;14(1):1–18.
[11]. Sage MR, Blumbergs PC. Primary empty sella turcica: a radiological anatomical correction. Australas Radiol. 2000;44:341–8.
[12]. Bragagni G, Bianconcini G, Mazzali F, Baldini A, Brogna R, Iori I, et al. 43 cases of primary empty sella syndrome: a case series. Ann Ital Med Int. 1995;10(2):138–42.
[13]. De Marinis L, Bonadonna S, Bianchi A, Maira G, Giustina A. Primary empty sella. J Clin Endocrinol Metab. 2005;90:5471-7.
[14]. Fouad W. Review of empty sella syndrome and its surgical management. Alexandria Journal of Medicine. 2011;47:139–147.
[15]. Braatvedt GD, Corral RJ. The empty sella syndrome: much do about nothing. Br J Hosp Med.1992;47:523–5.
[16]. McGrail KM, Zervas NT. The empty sella syndrome. In: Youmans JR, editor. Neurological surgery. Philadelphia: WB Saunders; 1990;(121).p.3505–13.
[17]. Berke JP, Buxton LF, Kokmen E. The empty sella. Neurology. 1975;25:1137–43.
[18]. Sander EC, Peter Jr WC. Empty sella syndrome. In: Wilkins R, Rengachery S, editors. Neurosurgery. New York: McGraw-Hill; 1996. p. 1367–73.
[19]. Olson DR, Guiot G, Dereme P. The symptomatic empty sella: prevention and correction via the transsphenoidal approach. J Neurosurg. 1972;37:533–7.
[20]. Brisman R, Hughes JEO, Mount LA. Cerebrospinal fluid rhinorrhea and empty sella. J Neurosurg 1969;31:538–42.
[21]. Arlot S, Lalau JD, Galibert P, Quichaud J. Primary empty sella turcica. Analysis of 14 cases and review of literature. Ann Endocrinol (Paris). 1985;46(2):99–105.

Dr. Anju Dhiman, et. al. "MRI Imaging of Partial Empty SELLA." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(07), 2022, pp. 05-08.