

Case Report: An IIH Induced Endometriosis that Diagnosed by OCT, and Revealed Ten Years Dilemma of HPG Axis Dysfunction due to Pressure Effect of CSF on Pituitary Stalk

Bitá Shalbafan^{1,*}, Seyed Kianoosh Naghibzadeh², Hajar Aminzadeh^{3,4}, Hossein Lanjanian^{5,6}, Bardia D Balouch⁷, Katayon Berjis⁸, Hamid Sajjadi^{9,10}

¹Clinical Research Development Center of Labbafinejad Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran

²Department of Biological Sciences, Tarbiat Modares University, Tehran, Iran

³Department of Cognitive Science Studies, Shahid Beheshti University, Tehran, Iran

⁴Department of Cognitive Modeling, Institute for Cognitive Science Studies, Tehran, Iran

⁵Molecular Biology and Genetics Department, Engineering and Natural Science Faculty, Istinye University, Istanbul, Turkey

⁶Cellular and Molecular Endocrine Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

⁷TRUST/FALCON RAY Imaging (X-Ray and Visible Spectrum) Tehran, Iran

⁸Department of Reproductive Biology, Academic Center for Education, Culture and Research, Qom branch, Qom, Iran

⁹Director, Department of Ophthalmology, Acacia Medical Center, Dubai, UAE

¹⁰Director of Neuro-Ophthalmology, San Jose Eye and Laser Medical Center, California, USA

ABSTRACT

A 50 years old female patient stepped into Neurology practice, who had been suffering from intractable headaches and followed up for 10 years. At the meantime, she was secondarily assessed by Endometriosis stage-II. Meanwhile, the lab workup did not reflect much of an off the chart hormonal study, Anemia was a point of consideration. Although treatment for Anemia was successfully fulfilled, no progression was noted with mending Endometriosis symptoms and headaches. To that end, the patient was referred to Neurologist. She underwent a brain MRI study and was reported by empty Sella as an incidental finding. As a result, fundus photography was performed to check for papilledema, where no significant findings were reported. However, thus Empty Sella was in combination with severe headaches, Optical Coherence Tomography (OCT) was employed to have a closer look into her Optic Disc. OCT findings of the Retinal Nerve Fiber Layer (RNFL) over the Circumpapillary Tomogram and choroidal folds, concluded a micro-papilledema that finally provided an explanation for those chronic headaches. To that end, the patient went through a Lumbar Puncture (LP), where an intracranial pressure (ICP) of 29 cmH₂O was measured, CSF exam showed no cells and so normal Biochemical analysis. She was eke prescribed by Acetazolamide and constantly studied through the OCT, in order to

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***Corresponding Author**

Bitá Shalbafan

Clinical Research Development Center of Labbafinejad Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran, Tel: +989161119656

E-mail: Shalbafan.b@gmail.com

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comprehend the ICP reduction based on RNFL thickness decrease and clinical review. Along with ICP reduction, improvements were observed in Endometriosis symptoms. Such recovery was likewise perceived in headaches to occur in lower frequencies, duty cycles and severities. Research has indicated the correlation between IIH and the occurrence of Gynecologic disorders, including Endometrial issues and Polycystic Ovarian Syndrome (PCOS). Androgen excess has been discussed to be prevalent among women with IIH. An NIH fundamental diagnostic criterion for PCOS, demands a clinical or biochemical element of androgen excess. Otherwise, The ICP elevation by IIH impacts on Pituitary Stalk, which causes the Hypothalamic-Pituitary-Gonadal Axis (HPG Axis) to become misaligned with respect to its mechanism. The HPG Axis encounters the unified functionality of those included glands. Once the Pituitary Stalk withstands an Empty Sella, changes in Gonadotropin Releasing Hormone (GnRH), would leave metabolic impacts on Endometriosis development. The additional malfunctioning among the HPG Axis would cause alternations in Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH), which both contribute to Endometriosis. Moreover, the HPG Axis, as a unified hormonal system to be disturbed, would drawback a lack of balance in Estradiol Progesterone (EP). Such impairment would transform the Uterine tissue and could therefore influence the progression of Endometriosis. Gynecologists are hence recommended to consider the probability of IIH or any condition that elevates the ICP; meanwhile experiencing patients' long-term lack of response to Endometriosis treatments, in combination with headaches. Thus, the IIH or any ICP elevating condition could be easily diagnosed in their early stages and monitored by simple and non-invasive studies of Optic Disc Optical Coherence Tomography (Disc OCT). Therefore, an OCT study could be a cost-effective approach to maintain the quality of care for women with Endometriosis, who may alternatively be tolerated by IIH, even in its early stages.

Keywords: Endometriosis, Idiopathic Intracranial Hypertension (IIH), Optic Coherence Tomography (OCT), Headache.

INTRODUCTION AND LITERATURE

Heinrich Quincke initially defined Pseudotumor Cerebri (PTC) in 1983, as a defect in Cerebrospinal Fluid (CSF) dynamics that results in Raised Intracranial Pressure

(RICP) [1]. Thus, the etiology of the disease has been mostly unknown, it was further entitled as Idiopathic Intracranial Hypertension (IIH) [1]. Visual Impairment caused by Papilledema is one of its known symptoms [1], for which funduscopic exams have been widely used to diagnose and verify it [2]. However, as long as the evaluation of increased ICP has recently experienced to be a more accurate approach via Optical Coherence Tomography (OCT), IIH diagnosis has eke become an interesting subject of study [3]. Research has indicated the correlation between IIH and the occurrence of gynecologic disorders, including Endometrial disorders [4] and Polycystic Ovary Syndrome (PCOS) [5].

The reviewed case encounters a female patient suffering from Endometriosis along with dilemmatic headaches for ten years. Hence, this case review aims to reflect the potential of OCT as a non-invasive solution to approach the cause of those endometrial disorders that come in combination with severe headaches for long durations of time.

CASE REPORT

A 50 years old female stepped into Neurology practice with her Gynecologist referral to receive treatment for her severe headaches. Her referral otherwise contained a complete medical history, regarding her Obstetric and Gynecologic backgrounds. The cited record encountered her obstetric experiences of her 4 pregnancies (Gravidity 4), where 3 of them were delivered after 40 weeks (Para 3) and remained alive (Living 3). However, one of them was an Ectopic Pregnancy (EP1) that belonged to an experience of 15 years prior to the addressing referral. Her concluded Obstetric history was therefore a G3 P4 L3 EP1, from which all the 3 terminations were by normal vaginal delivery without any complications. The first pregnancy was just a year after her Menarche, and the other two each occurred in an annual sequence, forwarding to it. Secondary Dysmenorrhea with a Visual Analog Scale (VAS) of score 3 (out of 10) was her complication a year after her last delivery, along with Severe Dyspareunia with a VAS score of 10 (out of 10). The above reviewed Ectopic Pregnancy of her, induced an intra-abdominal hemorrhage that was drained out by Laparotomy; where the surgeon reported a Score-2 Endometriosis, based on their observation. Since that incident of 15 years before this referral, she had been experiencing more or less regular menstruations, regardless of her Hypermenorrhea and a few days of Perimenstrual Spotting. Her sexual aspect of living

was not intact anymore after she stopped having intercourse, followed by her husband's passing away, 10 years before the reviewing referral. The referral notes also remarked an abdominopelvic review of her by ultrasonography, where a moderate Adenomyosis was reported.

At the meantime, she was assessed by intractable headaches, some assuming Migraine and others addressed it as tension headaches and followed for 10 years to have her headaches controlled.

On the other hand, regardless of her lab workup not reflect much of an off the chart hormonal study, the Anemia induced

by Hypermenorrhea was a point of consideration to provide a possible reason for headache. Although treatment for Anemia was successfully fulfilled, no progression was noted with mending Endometriosis symptoms and her headaches' severity, frequency or duty cycle. When She underwent an MRI and reported coping with Empty Sella (Figure 1). The referenced Mid-Sagittal Brain MR Image was acquired through the T2 sequence of Magnetic Resonance Imaging, where the CSF is more brightly projected [6]. Therefore, Empty Sella (filled with water) could be noted from the high signal intensity [7] of her Sella Turcica.



Figure 1. Arrow indicates Empty Sella in Mid-Sagittal cut of the patient's Brain MRI (T2 Sequence).

Whereas the Empty Sella was a red flag for Raised Intracranial Pressure (RICP) in combination with severe headaches, there were no significant findings in ophthalmologic consultation and normal Fundoscopy. Optical Coherence Tomography (OCT) was moreover performed to investigate

the Optic-Nerve head more accurately. Raised Intracranial Pressure (RICP) was concluded to consequently project a Micro-Papilledema, identified through the 3D Optic Disc OCT (Figure 2).

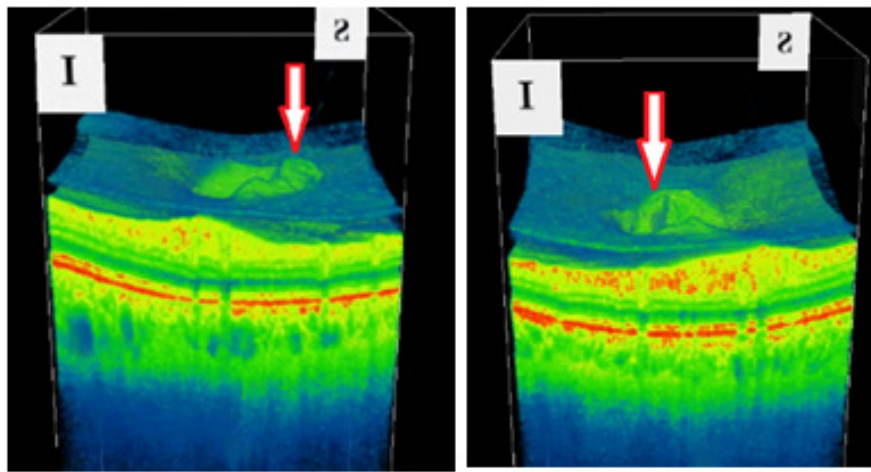


Figure 2. Micro-papilledemas are pointed with arrows in patient’s 3-Dimensional OCT a)Right Optic Nerve Head b)Left Optic Nerve Head (S:Superior,I:Inferior)

Otherwise, regardless of the Micro-Papilledema being projected through her OCT Circumpapillary Tomogram (Figure 3) over the normative database;

progression of papilledema is sequentially concluded, as it complies with *Sajjadi 2017 Pattern 2 of PTC in absence of visible or Micro-Papilledema* [8].

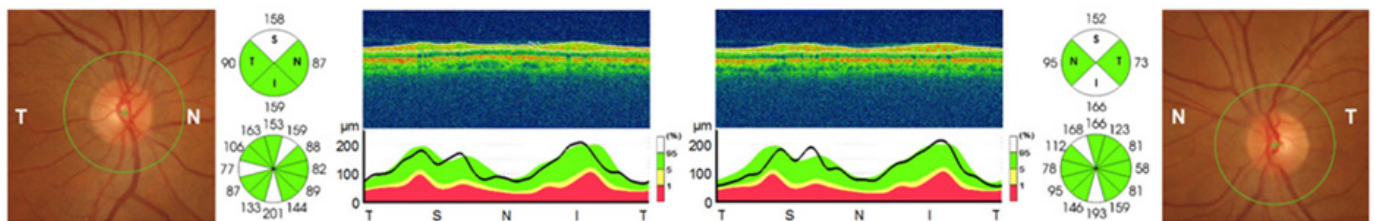


Figure3. Bilateral projection of patient’s OCT CP-NFL Tomogram and Fundus OD (Right Eye) OS (Left Eye)

To that end, the patient went through Lumbar Puncture (LP); where Idiopathic Intracranial Hypertension (IIH) was confirmed, by the Cerebrospinal Fluid (CSF) Opening Pressure to be 29 cmH₂O at her LP, as with meeting the normal Cerebrospinal Fluid (CSF) lab workup. This could rule out other possibilities, in order to verify IIH. She was eke prescribed by Acetazolamide and constantly studied through OCT and went under clinical reviews to comprehend the ICP reduction based on RNFL thickness decrease Along with ICP decrease, improvements were observed in Gynecologic Symptoms. Such recovery was likewise perceived in headaches to occur in lower frequencies and severities.

Discussion

Androgen excess was discussed to be prevalent among women with IIH [9]. An NIH fundamental diagnostic criterion for Polycystic Ovary Syndrome (PCOS), demands a clinical or biochemical element of androgen excess [10]. Otherwise, The ICP elevation by IIH impacts on Pituitary Stalk [11] and Empty Sella Turcica [12], which causes the Hypothalamic-Pituitary-Gonadal (HPG) Axis to confront fault in its mechanism [13]. HPG Axis encounters the unified functionality of those included glands [14]. Once the Pituitary Stalk withstands an Empty Sella, changes in Gonadotropin-Releasing-Hormone (GnRH) [15] would leave metabolic effects on Endometriosis development [16]. This mechanism has been reflected visually in Figure 4.

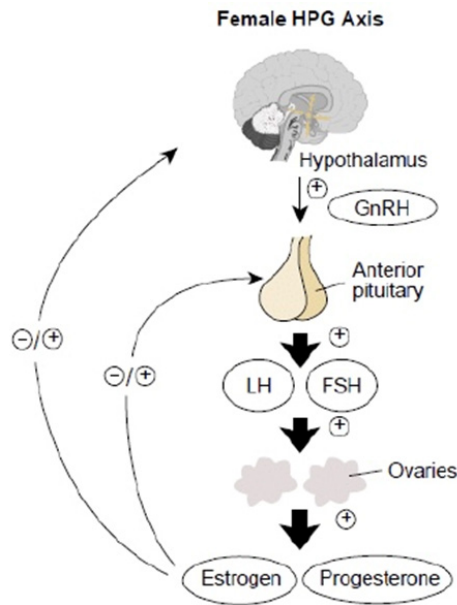


Figure 4. RICP Relation with Endometrial Issues [4]

The additional malfunctioning among HPG Axis would cause alternations in FSH and LH [17], which both contributes to Endometriosis [18]. Moreover, when HPG Axis is disturbed as a unified hormonal system, would drawback a lack of balance in Estradiol Progesterone [19]. Such impairment would transform the Uterine tissue and could therefore influence the progression of Endometriosis [19], [20].

Another study has similarly outlined Hyperprolactinemia to be significantly associated with Endometriosis, in a study of 256 infertile females [21]. Empty Sella was cited as an etiologic concern for Hyperprolactinemia, where MR visualizations of the Sellar area could reveal it [22]. On the other hand, such a phenomenon was reported in some cases to lead to the proliferation of Proliferative Endometrial Glandular Cells and raise the probability of Endometrial Cancer Cell development [23]. Another dilemmatic case of an adolescent female was reported to suffer from Endometrial issues and PCOS, which was concluded to be driven by IIH [24].

Gynecologists are hence recommended to consider the probability of IIH or any condition that elevates the ICP; meanwhile experiencing a long-term lack of response to Endometriosis treatments, in combination with headaches. Thus, the IIH or any ICP elevating condition could be easily diagnosed in early stages by OCT [8], [25], as long as its volumetric tomography reveals much more clinical information than ophthalmic clinical reviews, such as the micro-papilledema [26] of this case. OCT observation of such a

condition by changes in RNFL thickness [8], [27] and Choroidal fold has been so far a novel approach in diagnosing IIH and ICP elevated disorders [27]. Patients could be likewise monitored by OCT as a noninvasive [28], non-ionizing [29] and cost-effective approach [30].

Otherwise, some reports warned about the adoption and withdrawal of pharmacologic treatments for Endometriosis, such as Leuprolerin Acetate [31] and Danazol [32], which could induce IIH. This would therefore develop a transactional progression of both disorders, increasing clinical overheads for patients and so negatively impacting their quality of life.

LIMITATION

The patient came into Neurology practice with a referral note from a registered Gynecologist to receive treatment for her headaches. Her former medical data, by which she was evidently diagnosed with Endometriosis during that past 15 years, couldn't be unfortunately retrieved. Thus, the lack of proper EMR systems has been a regional liability, and she didn't have a physical copy of her medical records with her. Those medical records included her abdominopelvic ultrasonic studies and lab workups. However, her referral note that addressed her Endometriosis was acceptable, since she was experiencing relative symptoms at the time. The referral otherwise encountered data that could verify Gynecologist assertions. This includes the rational alignment of her noted medical history and the result of the addressed ultrasonic study of her Abdominopelvic region, along with

Neurological findings, as discussed above. Such a conclusion could hence make that referral note genuine.

CONCLUSION

This case report reviewed the clinical narration of a patient, who had been suffering from Endometriosis symptoms and agonizing headaches during her past 10 years from stepping into Neurology practice. Her Endometriosis was concluded to be induced by IIH, which she was considerably relieved after her Raised ICP treatment. The mechanism of HPG Axis misalignment, driven by her Empty Sella and its effect on her GnRH intensity, was described to trigger Endometriosis by leaving an impact on LH and FSH levels. This event was discussed to not only affect the patient's quality of life with Endometriosis symptoms, but also raise the possibility of carcinogenic proliferation. Otherwise, a treatment of Endometriosis was cited to may have negative impulses, as it could originate IIH, which irritates a transactional progression of both issues. As a non-invasive and cost-effective tool, OCT was recommended to be utilized for screening patients with those Endometrial disorders that are resistant to treatment and might also experience a Neurological indication, such as headaches. On the other hand, OCT was shown to enjoy supremacy in verifying IIH over the Funduscopic persuasion of Papilledema, which makes it more reliable in dealing with such reported cases for day-to-day practices.

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