Diagnosis and Evolution of Chronic, Untreated Papilledema from Idiopathic Intracranial Hypertension; a long-case study

Case Report submission for Resident’s Day at the AAO Conference 2012

A 41-year-old noncompliant female declining medical therapy for chronic and untreated idiopathic intracranial hypertension, experiencing persistent and fluctuating symptoms of headaches, yet minimal worsening of visual acuity, clinical appearance of papilledema, and visual field loss.

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**Case History**

- **Patient Demographics**
  - 41 year old African American female living near Boston, MA.

- **Chief Complaint**
  - On March, 2007, patient presented with complaint of transient visual obscurations OD > OS and an increase in headache frequency in recent months (1-2 out of 4 on her own scale). Patient describes a transient dimming of her peripheral vision OD when she wakes up in the morning and when she stretches. Duration is only for a few seconds; no associated neurological symptoms such as dizziness, tingling, numbness, or LOC.

- **Ocular History**
  - Low myopia OU with against-the-rule astigmatism OD
  - Ocular health unremarkable per patient report.
  - Last eye exam: 2 years prior at private provider.

- **Medical History**
  - Iron-deficiency anemia
  - Headache
  - Obesity
  - Dysmenorrhea
  - Vitamin D deficiency
  - Chronic otitis externa
  - Positive PPD (history of TB prophylaxis x 1991)

- **Medications**
  - Ferrous gluconate 325mg tablet po BID
  - Ibuprofen 600mg tablet po TID as needed for pain and inflammation
  - Ascorbic acid 250mg tablet po TID (non-VA medication)
  - Prescribed: Acetazolamide 250mg po BID (but not taking!)
Denies oral contraceptives for more than 5 years because of stomach ulcer (discontinued 3 months prior to symptom onset)

• Pertinent Findings
  o Serial images of MRI/CT/OCT/AF/FFA/fundus over more than 5 year-span are available and of high quality.
  o **Clinical - at time of presentation on March 29, 2007.**
    • **OD**
      • BCVA 20/20
      • Disc edema with blurred disc margins margins 360, no physiological cupping visualized, questionable SVP, no peripapillary hemorrhages, mild obscuration of blood vessels, normal color.
      • HVF 30-2 Sita Standard on March 30, 2007:
        o Reliable; enlarged blind spot.
    • **OS**
      • BCVA 20/20
      • Disc edema with blurred disc margins inferior and inferotemporal, no peripapillary hemorrhages, no spontaneous venous pulsation, mild obscuration of blood vessels.
      • Mild pallor and secondary atrophy superotemporal.
      • HVF 30-2 Sita Standard on March 30, 2007:
        o Reliable; fairly dense mild inferior arcuate defect.
  o **Clinical – most recent eye exam in July, 2012.**
    • **OD**
      • BCVA 20/20
      • Stable appearance of disc edema with blurred disc margins 360, no physiological cupping visualized, no SVP, no peripapillary hemorrhages, mild obscuration of blood vessels, normal color.
      • HVF 30-2 Sita Standard on July 13, 2012:
        o Reliable; enlarged blind spot, otherwise grossly full.
    • **OS**
      • BCVA 20/20
      • Disc edema with blurred disc margins inferior and inferotemporal (stable in appearance);
      • Questionable slight increase in superotemporal pallor.
      • HVF 30-2 Sita Standard on July 13, 2012:
        o Reliable, mild increase in dense inferior arcuate defect with progression into the inferotemporal quadrant.
**Physical**

- Patient is 5’1” and weighed 210 lbs near the time of papilledema diagnosis in March, 2007. Her BMI was 39.7 (obesity = BMI of 30 or greater).
- Her last recorded and most recent weight was 231.2 lbs in October, 2010.

**Laboratory Studies**

- Lumbar puncture on April 13, 2007 showed an opening pressure of 270mm CSF. The CSF had normal glucose and protein levels, a negative culture, and was of overall normal composition.
  - Patient initially refused a recommended diagnostic lumbar puncture procedure one day after initial presentation. Patient is anxious and worried about the possible diagnosis; chooses to discharge from the hospital against medical advice.
  - Routine bedside lumbar puncture was attempted unsuccessfully 2 weeks later.
  - Fluoroscopy-guided lumbar puncture on March, 2007 was performed successfully and without difficulty.
- A repeat lumbar puncture on May 30, 2007 revealed an opening pressure of 210mm CSF.
- MRI with gadolinium: No abnormality; empty sella.
- Head CT was negative for any hemorrhage, mass effect, or midline shift.

**Differential Diagnosis**

- **Primary**
  - Idiopathic intracranial hypertension

- **Others**
  - Mass/space occupying lesion of CNS
    - A head MRI with gadolinium on March 30, 2007 was normal and showed no evidence of a space-occupying lesion.
  - Optic disc drusen
    - Disk autofluorescence confirms no drusen.
  - Venous sinus thrombosis
    - Negative patient history; no thrombus visualized on imaging.
  - Meningitis or other inflammatory processes
    - Normal blood culture, CT, and CSF not indicative of condition.
  - Subarachnoid hemorrhage
    - No evidence of CSF erythrocytosis on lumbar puncture and no blood visualized on neuroimaging.
• Diagnosis and Discussion
  
  o Elaborate on the condition
    • While the exact pathophysiology of IIH remains uncertain, it is probably related to overproduction of CSF, decreased CSF outflow, decreased reabsorption via the arachnoid villi, or narrowing of the transverse dural sinuses.
    • Headache is the most common presenting symptom of IIH.
    • Transient visual obscurations, brief episodes of monocular or binocular visual loss, are noticed in approximately 75% of patients.
    • Papilledema is the ophthalmologic hallmark of the disease and should be distinguished from pseudopapilledema and optic neuropathy.
    • Papilledema from idiopathic intracranial hypertension in rare cases may be asymmetric.
    • Our patient fit the following “Modified Dandy criteria”:
      • Signs and symptoms of increased intracranial pressure (headaches, nausea, vomiting, transient obscurations of vision, and papilledema).
      • No localizing neurologic signs otherwise
      • CSF can show increased pressure, without chemical abnormalities in its composition
      • Normal to small ventricles was demonstrated on imaging
    • Patients with IIH have more enlarged blind spots in the visual field.
    • Based on the patient’s profile such as age (15-44yo), gender, weight (>20% of ideal body weight), prior use of oral contraceptives, along with the constellation of symptoms and clinical tests, the patient was diagnosed with idiopathic intracranial hypertension.

  o Expound upon unique features
    • Patient’s symptoms of headache are fairly mild and are triggered by near demands. They did not seem like disabling headaches, and are not provoked by valsalva, reclined state, or bending over. She does not awake with them.
    • Patient has been unable to lose weight, and in fact, has gained about 20 lbs over the past 5 years.
    • Patient’s clinical papilledema is rather asymmetric between the eyes.
    • She was diagnosed with IIH at age 36 and is presently 41 years of age, an age range that is consistent with female fertility.
    • In 2008, she reports experiencing tinnitus that she describes as “a heartbeat in my ears.” Pulsatile tinnitus occurs in up to 60% of IIH patients.
• **Treatment & Management**
  
  o **Treatment and response to treatment**
    
    ▪ Traditional medical management for IIH remains carbonic anhydrase inhibitors, weight loss, and prednisone in the context of sudden vision loss. As such, patient was discharged on acetazolamide 250mg bid on April 13, 2007 and advised to return to the hospital if she suffered worsening of headaches or vision.
    
    ▪ Patient was advised that weight loss may help reverse symptoms and signs of IIH, and that increasing BMI and weight gain are associated with progressively greater risk of the disease.
    
    ▪ Patient was compliant with acetazolamide consistently for the first two weeks, became inconsistent and used the medication on an “as needed” basis the month thereafter (May, 2007), and up until present has completely discontinued and been without medical therapy (despite report of mild headache relief with medication).
    
    ▪ Reports side effects with acetazolamide such as drowsiness and numbness of fingers and feet. Acetazolamide was substituted with Methazolamide, but patient similarly discontinued this medication because she reported losing consciousness after ingesting the medication.
    
    ▪ Patient has been noncompliant and refused medical treatment for IIH the past >5 years despite warnings, and her weight remains elevated. She reports medications make her feel uncomfortable and believes they are unnecessary for the disease.
    
    ▪ Symptoms of chronic, low-grade headaches have been persistent since the onset of IIH, but wax and wane depending on the day. Patient receives relief with the use of oral Ibuprofen on as needed basis. Transient visual loss has mostly subsided.
    
    ▪ Minimal to no change in clinical appearance of papilledema OD>OS, with minimal increase in sectoral optic atrophy OS (initial and recent fundus images available).
    
    ▪ Visual field loss has remained overall stable OD with a slight enlargement of the blind spot. Most recent visual field on July 13, 2012 shows evidence of an increase in the inferior arcuate defect OS with expansion into the inferotemporal quadrant, corresponding to optic nerve atrophy and pallor (serial humphrey visual fields ~6month intervals available).
    
    ▪ Other surgical and medical interventions have been considered for patient, such as lumbo-peritoneal or ventriculo-peritoneal shunts, or optic nerve sheath...
fenestrations. However, given the fairly stable evolution of her condition up until recently, surgical options have been deferred.

- Neurological exam and the preservation of her central vision (BCVA OD/OS 20/20) have remained fairly unchanged after five years.

- **Refer to research where appropriate**
  - The portion of the ganglion-cell layer serving central vision, the papillomacular bundle, is spared until the very late stage of papilledema. It is usually affected after the rest of the visual field is lost.
  - The earliest field defect is enlargement of the physiologic blind spot. The most common defect is a nasal step or arcuate scotoma.
  - With time, the defects can progress and result in severe visual field constriction. Thus, quantitative visual field assessment is critical when deciding upon treatment.
  - Optical coherence tomography is an effective imaging modality to measure optic nerve and RNFL swelling in papilledema, argued to be a newer adjunct to monitor IIH and provide a quantitative assessment. The patient’s OCT scans of the right eye show a mild increase in quantitative measurement of edema.
  - Additional medication such as tricyclic antidepressants (in low doses to prevent side effect of weight gain) may be used to treat the headache in IIH.
  - Surgical procedures divide into 2 types: CSF and non-CSF diversion techniques.
    - Ventriculoperitoneal and lumboperitoneal shunts are employed in cases of failed medical therapy and with medically intractable headache.
    - Optic nerve decompression creates a fenestration in the dural sheath behind the globe. Induced weight loss by bariatric surgery
    - More recently, venous sinus stenting may be beneficial when there is suspected venous sinus thrombosis and narrowing of the sinuses.

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**Bibliography & literature review**


• Conclusion
  
  o **Clinical pearls, take away points**

  ▪ Although we don’t have a concrete understanding of the exact pathophysiology of IIH, existing literature often speculates that untreated IIH can lead to severe vision loss, optic atrophy, and blindness if left untreated. However, our patient has demonstrated retention of close to all of her peripheral and central vision in the right eye, and only mild loss of peripheral vision in the left eye, despite chronic papilledema for more than five years.

  ▪ While many patients fare well with conservative monitoring, the risk of visual deterioration is significant for those having a chronic course, particularly in a case like ours where the elevated intracranial pressure is untreated.

  ▪ The absence of medical therapy makes you curious about the sensitive “threshold” at which elevated intracranial pressure can continue to swell the nerve and impact ganglion cells, versus when it reaches its “tipping point” and advances to elevate the ICP so high that it atrophies the ganglion cells and causes nerve pallor.

  ▪ The incidence of IIH in the USA has increased and will almost certainly continue to rise with the current obesity epidemic. Further studies and controlled clinical trials are essential to uncover the elusive pathophysiology of IIH and optimize its treatments.