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Other titles: Einseitige Stauungspapille bei asymmetrischem Augendruck

Unilateral Papilledema after Trabeculectomy in a Patient with Intracranial Hypertension

Einseitige Stauungspapille bei asymmetrischem Augendruck

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Schlüsselwörter
- Stauungspapille
- Trabekulektomie
- Pseudotumor cerebri
- idiopathische intrakranielle Hypertension

Key words
- trabeculectomy
- unilateral papilledema
- idiopathic intracranial hypertension
- glaucoma

Zusammenfassung

Hintergrund: Erhöhter intrakranieller Druck ist gewöhnlich assoziiert mit einer beidseitigen Stauungspapille.

Anamnese und Befund: Eine 63-jährige adipöse Frau klagte über visuelle Störungen am rechten Auge, die erstmals nach der Durchführung einer Trabekulektomie aufgetreten waren. Der Augendruck rechts lag bei 11 mmHg und links bei 24 mmHg. Am rechten Auge zeigte sich eine Papillenschwellung, die linke Papille war randscharf. In der Lumbalpunktion wurde ein Druck von 32 cmH_2O gemessen. Schädel-MRI, neurologische Untersuchung und die Zusammensetzung des Liquor cerebrospinalis waren unauffällig. Entsprechend den modifizierten Dandy-Kriterien wurde eine idiopathische intrakranielle Hypertension diagnostiziert.

Verlauf: Eine perorale Therapie mit Azetazolamid während einem halben Jahr führte zu einem vollständigen Rückgang der rechtsseitigen Papillenschwellung.

Schlussfolgerung: Der intrakranielle-intraokuläre Druckgradient am rechten Auge war im Vergleich zum linken Auge deutlich erhöht. Wir vermuten, dass erst ein Druckunterschied zwischen dem intrakraniellen und dem intraokulären Kompartement zum Kollaps des axoplasmatischen Transportes im Bereich der Lamina cribrosa und zur Papillenschwellung führt. Basierend auf entsprechenden Berechnungen bei drei weiteren publizierten Fällen mit einseitiger Stauungspapille sollte bei der Beurteilung einer Stauungspapille deshalb der Augendruck mitberücksichtigt werden.

Abstract

Background: Increased intracranial pressure usually leads to bilateral disc swelling.

History and Signs: A patient presented with recurrent visual disturbances following trabeculectomy in the right eye. Intraocular pressure in the right and left eye were 11 and 24 mmHg, respectively. The optic nerve head was swollen in the right, but not in the left eye. Lumbar puncture showed an opening pressure of 32 cmH_2O. Magnetic resonance imaging, neurological examination and composition of cerebrospinal fluid were normal. According to the modified Dandy criteria, an idiopathic intracranial hypertension was diagnosed.

Therapy and Outcome: Treatment with acetazolamide led to resolution of papilledema in the right eye within six months.

Conclusion: The intracranial-intraocular pressure gradient in the right eye was markedly higher as compared to that of the left eye. We suggest that this pressure gradient induced the collapse of axoplasmatic transport at the lamina cribrosa with subsequent disc swelling. As no significant pressure gradient was present in the left eye, the optic disc remained normal. Based on analogous calculations in three additional published cases of unilateral papilledema we thus suggest that intraocular pressure should be taken into account when evaluating patients with papilledema.

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Background

Bilateral swelling of the optic disc is the hallmark of increased intracranial pressure. Knowledge about whether an optic disc swelling is uni- or bilateral is commonly used to differentiate between the various causes of optic disc swelling. A case with unilateral papilledema is presented.

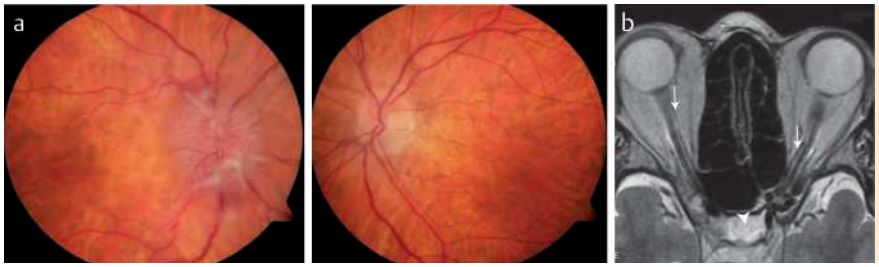

Fig. 1 **a** Fundus photograph demonstrates swollen, hyperemic right optic disc with splinter hemorrhages and cotton wool spots and a normal left optic disc. **b** Axial T_2-weighted magnetic resonance imaging shows dilated subarachnoidal space in both orbital optic nerves (arrows), as well as partial empty sella (arrowhead).

History and Signs

A 63-year-old obese woman with a history of glaucoma was referred to our clinic due to unspecific recurrent visual disturbances that appeared shortly after a trabeculectomy had been performed in her right eye two months earlier. Due to left esotropia she was amblyopic in the left eye.

On examination we determined a best-corrected Snellen visual acuity of 0.7 on the right and 0.1 on the left, amblyopic, eye. Intraocular pressure (IOP) was 11 ± 1.3 mmHg in the right and, despite topical antiglaucomatous treatment, 24 ± 1.3 mmHg in the left eye. Values represent mean ± standard error of the mean of the first four consecutive IOP measurements. Biomicroscopy disclosed a prominent filtering bleb and a swollen hyperemic optic disc in the right eye and otherwise unremarkable anterior and posterior segments on both sides (**Fig. 1a**). Static perimetry revealed a mild relative scotoma in the periphery of both eyes, which was sufficiently explained by the known glaucoma history. Eye motility was normal in all gaze directions. Magnetic resonance imaging (MRI) showed a partial empty sella sign and a dilated subarachnoidal space in both optic nerves and was otherwise normal (**Fig. 1b**). A lumbar puncture showed an opening pressure of 32 cmH_2O which corresponds to 23.5 mmHg (**Fig. 2**) and CSF analysis failed to reveal any signs of intracranial inflammation.

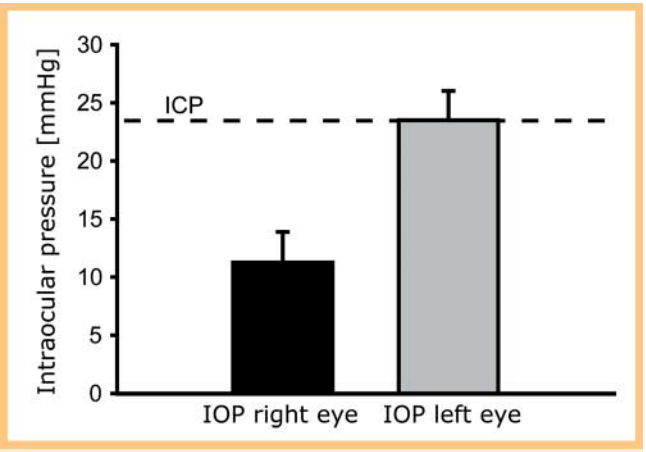

Fig. 2 Intraocular and intracranial pressure for both eyes. There is a marked pressure gradient in the right eye, whereas ICP and IOP are at about the same level in the left eye. Error bars indicate standard error of the mean of the first 4 IOP measurements before treatment initiation.

Therapy and Outcome

According to the modified Dandy criteria idiopathic intracranial hypertension (IIH) was diagnosed, a treatment with systemic azetazolamide 3 × 500 mg p. o. was started and the patient was encouraged to loose weight. Six months later papilledema had resolved and azetazolamide was slowly tapered.

Discussion

Papilledema in cases of increased intracranial pressure usually affects both eyes. Although asymmetries in the extent of swelling are common, only few reports have shown that papilledema may be strictly unilateral [1 – 3]. We suggest that the asymmetric ICP/IOP gradient (**Fig. 2**), having been higher in the right eye, led to a collapse of anterograde axonal transport at/behind the lamina cribrosa and the development of papilledema of the right eye only. As the IOP was increased in the left eye, no significant pressure gradient was existent at the lamina cribrosa and the optic disc remained normal. As the subarachnoidal space of the optic nerve is septated and flow of CSF may encounter resistance at the perforations of the septa, it is possible that the pressure gradient of the intraocular and intracranial department may extend from the lamina cribrosa up to the orbital portion of the optic nerve [5].

To evaluate our hypothesis, we calculated the ICP/IOP pressure gradients for previously published cases of unilateral papilledema [2, 4]: we determined –11.5 mmHg, –5 mmHg and –21 mmHg in eyes with papilledema, whereas pressure gradients were +6.5 mmHg, +4 mmHg and +5 mmHg in the corresponding healthy eyes. Compared to our own findings with –12.5 mmHg and +0.5 mmHg, respectively, these values further support our view that not the absolute values of ICP are relevant for the development of papilledema but rather the pressure gradient at the lamina cribrosa.

Conflict of Interest: None

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