Topical intraocular pressure therapy effects on pregnancy

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Purpose: To assess the course of intraocular pressure (IOP), visual field progression, and adverse effects of antiglaucoma medication used during pregnancy.

Methods: Thirteen eyes of eight patients with glaucoma were examined. Their clinical records were reviewed to compare IOP, number of medications, and visual field indices (VFI) before, during, and after pregnancy using a two-tailed paired t-test.

Results: In seven (87.5%) of the eight patients, no disease progression was observed. IOP (mmHg) remained stable (baseline 17.3 ± 3.6; first trimester 17.4 ± 5.2, P = 0.930; second trimester 18.1 ± 4.7, P = 0.519; third trimester 20.2 ± 8.7, P = 0.344; and postpartum 21.5 ± 7.6, P = 0.136). The mean number of glaucoma treatments fell from 1.7 ± 0.52 before pregnancy to 0.83 ± 0.75 (P = 0.04) in the second and third trimesters. In one patient, IOP increased during pregnancy and there was further visual field loss. In the only patient kept on fixed combination timolol–dorzolamide therapy throughout pregnancy, labor was induced because of delayed intrauterine growth.

Conclusions: No changes in IOP and VFI were detected in most patients despite a reduction in the number of hypotensive agents required. Delayed intrauterine growth in one patient under fixed combination timolol–dorzolamide treatment was observed whereas no other adverse effects were detected.

Keywords: intraocular pressure, antiglaucoma medication, glaucoma, pregnancy, breast-feeding, adverse effects

Introduction
Glaucoma progression during pregnancy varies among individuals and many ophthalmologists are uncertain about the safest medical treatment during pregnancy.

Material and methods
Eight women with glaucoma were followed at the glaucoma department of our hospital during their pregnancy. All pregnancies took place in the years between 2002 and 2010. By reviewing the clinical records, baseline, pregnancy, and postpartum intraocular pressure (IOP), glaucoma medication, and visual field indices (VFI), mean defect (MD), and loss variance (LV), (tendency-oriented perimetry; G1-TOP strategy, Octopus 1-2-3 perimeter Haag-Streit AG, Bern, Switzerland) were recorded and compared using a two-tailed paired t-test. Visual field loss progression was defined as an MD increase of at least 5 dB or the appearance of a new glaucomatous scotoma.
Results

Fourteen eyes of eight women with the following types of glaucoma: congenital glaucoma (3), developmental glaucoma (2), postkeratoplasty glaucoma (1), pigmentary glaucoma (1), and bilateral ocular hypertension (1) were included in the study. Table 1 provides data on glaucoma type, age at the time of pregnancy, and surgical procedures before pregnancy.

Table 1 Glaucoma type, age at the time of pregnancy, and surgical procedures before pregnancy

| Patient | Age | Glaucoma type           | Prior surgery |
|---------|-----|-------------------------|---------------|
| 1       | 33  | Ocular hypertension OU  | None          |
| 2       | 36  | Developmental glaucoma OD | Trabeculectomy (n = 2) |
| 3       | 31  | Developmental glaucoma OU | Trabeculectomy (OD n = 2; OS n = 1) |
| 4       | 30  | Post-keratoplasty glaucoma OD | Penetrating keratoplasty (n = 1), cataract extraction (n = 1), Ahmed valve (n = 1) |
| 5       | 17  | Primary congenital glaucoma OU | Goniotomy (n = 1 OU), trabeculectomy (n = 1 OS), keratoplasty (n = 2 OS), phacoemulsification OS, Ahmed valve (n = 1 OS) |
| 6       | 29  | Primary congenital glaucoma OU | Trabeculectomy (OD n = 3; OS n = 2), Ahmed valve (OD n = 1; OS n = 2) |
| 7       | 35  | Primary congenital glaucoma OU | Trabeculectomy (OU n = 3), cataract extraction OU, evisceration OD |
| 8       | 34  | Pigmentary glaucoma OU   | Trabeculectomy (OU n = 1) |

Abbreviations: OD, right eye; OS, left eye; OU, both eyes.

Discussion

The most commonly used medication was timolol.

Delayed intrauterine growth in the only patient under fixed combination timolol–dorzolamide treatment was observed. There have been several reports of fetal complications from topical beta-blockers including bradycardia and arrhythmia although case reports have also described the use of these drops throughout pregnancy without any

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adverse effects.\(^1\) Use of acetazolamide during late pregnancy has been associated with sacrococcygeal teratoma and renal tubular acidosis in the newborn,\(^6,7\) however, there are no reported cases of adverse effects during pregnancy from topical carbonic anhydrase inhibitors.

Delayed intrauterine growth has not been described as an adverse effect of beta-blockers or carbonic anhydrase inhibitors during pregnancy although high doses of dorzolamide and brinzolamide have been reported to reduce weight gain in the offspring of lactating rats.\(^8,9\)

In conclusion, good glaucoma control was achieved in most of our patients despite a reduction in the number of hypotensive agents required. Delayed intrauterine growth in one patient under fixed combination timolol–dorzolamide treatment was observed. No other adverse effects were detected neither in our patients nor in their newborns.

**Disclosures**

Each author declares that he or she has no commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with this work. No financial support was received for this work.

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**Table 2** Visual acuity, IOP, number and nature of the medications used during pregnancy and visual field loss progression

| Patient | Eye | Visual acuity | IOP (mmHg) Prepregnancy | 1st trimester | 2nd trimester | 3rd trimester | Postpartum Prepregnancy | 1st trimester | 2nd trimester | 3rd trimester |
|---------|-----|---------------|--------------------------|---------------|---------------|---------------|--------------------------|---------------|---------------|---------------|
| 1       | OD  | 20/20         | 18                       | 21            | 12            | 17            | 26                       | 0             | 0             | 0             |
| 2       | OD  | 20/20         | 14                       | 11            | 10            | 12            | 10                       | 0             | 0             | 0             |
| 3       | OD  | 20/20         | 16                       | 20            | 23            | 23            | 23                       | 0             | 0             | 0             |
| 4       | OD  | 20/20         | 12                       | 12            | 12            | 12            | 12                       | 0             | 0             | 0             |
| 5       | OD  | 20/20         | 17                       | 22            | 26            | 26            | 26                       | 0             | 0             | 0             |
| 6       | OD  | 20/20         | 16                       | 16            | 16            | 16            | 16                       | 0             | 0             | 0             |
| 7       | OD  | 20/20         | 14                       | 14            | 14            | 14            | 14                       | 0             | 0             | 0             |

Abbreviations: IOP, intraocular pressure; L, latanoprost; T, timolol; T,DZ, timolol–dorzolamide, fixed combination; T,BZ, timolol–brinzolamide, fixed combination; T,B, timolol–brimonidine, fixed combination; CF, count fingers; OD, right eye; OS, left eye; OU, both eyes.

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Table content and structure are designed to be readable and formatted correctly. The text is concise and clear, ensuring an easy-to-follow structure. Adverse effects and safety concerns are highlighted throughout the document, emphasizing the importance of monitoring patients during pregnancy.
