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**Evaluation of Patient Age as a Risk Factor for Intraocular Pressure Elevation After Intravitreal Triamcinolone**

Dhananjay Shukla, Nagasubramaniam Vidhya, Noela M. Prasad, Rajendran Mahalakshmi, Chandarmohan Kolluru, and Ramaswami Krishnadas

**PURPOSE:** To evaluate the effect of patient age on intraocular pressure (IOP) response after intravitreal injection of triamcinolone acetonide (IVTA).

**DESIGN:** Interventional case series.

**METHODS:** A total of 164 outpatients (164 eyes) aged 21 to 80 years (mean, 56.8 years), presenting with exudative age-related maculopathy (51) or macular edema of various etiologies (113), received IVTA (4 mg/0.1 ml). The primary outcome measure was IOP elevation >21 mm Hg. Patients were re-evaluated at one week, and at one, three, and six months.

**RESULTS:** The mean baseline IOP was 15.07 mm Hg; the mean rise was 6.6 mm Hg. IOP >21 mm Hg was observed in 42 (25.6%) patients. In the age group ≤45 years, IOP rise occurred in 45% (14/31) patients, compared with 21% (28/133) of older patients (P = .006). The groups were similar in baseline IOP, IOP rise, mean time-lag to maximum IOP, and response to treatment.

**CONCLUSIONS:** IVTA caused more frequent IOP elevation in younger patients; other aspects of IOP response and its treatment were similar to older patients. (Am J Ophthalmol 2007;144:453–454. © 2007 by Elsevier Inc. All rights reserved.)

**TABLE. Age-wise Intraocular Pressure Profile in Patients Receiving Intravitreal Triamcinolone Injection**

<table>
<thead>
<tr>
<th>Age Group in Years</th>
<th>Number of Patients</th>
<th>Incidence of IOP &gt;21 mm Hg n (%)</th>
<th>Mean Initial IOP in mm Hg (95% CI)</th>
<th>Mean Pmax in mm Hg (95% CI)</th>
<th>Percent IOP Rise &gt;21 mm Hg (95% CI)</th>
<th>Time in Months to Reach Pmax (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>46–55</td>
<td>42</td>
<td>11 (26)</td>
<td>15.90 ± 2.60 (15.09–16.71)</td>
<td>22.12 ± 11.13 (18.65–25.59)</td>
<td>46.32 ± 58.01 (28.24–64.40)</td>
<td>2.81 ± 1.81 (2.25–3.37)</td>
</tr>
<tr>
<td>≥66</td>
<td>44</td>
<td>3 (7)</td>
<td>13.52 ± 2.75 (12.68–14.36)</td>
<td>17.61 ± 3.76 (16.47–18.75)</td>
<td>36.41 ± 34.76 (25.84–46.98)</td>
<td>2.23 ± 1.75 (1.70–2.76)</td>
</tr>
</tbody>
</table>

IOP = intraocular pressure; P_{max} = maximum IOP recorded during the follow-up; CI = confidence intervals.
mm Hg. Postinjection IOP > 21 mm Hg was observed in 42 (25.6%) patients. Mean time of IOP rise was 2.60 (median 3; range, one to six) months. The proportion of patients with increased IOP (14/31) in age group ≤ 45 years was more than that (28/133) among patients > 45 years (P = .006) (Table). Linear regression analysis demonstrated an increase of 0.1 mm Hg in post-IVTA IOP for every year of decrease in patient’s age (P = .040), after adjusting for baseline IOP and indications for IVTA. The mean maximum IOP was also higher in the group ≤ 45 years as compared with the older group (24.76 vs 20.93 mm Hg; P = .05). The mean time to reach the maximum IOP and the percent IOP rise were similar between the two groups (P values 0.641 and 0.07, respectively). Response to antiglaucoma pharmacotherapy was also similar in patients ≤ 45 and > 45 years of age (P = .381).

The mean age of the patients in large-scale studies on post-IVTA IOP ranged from 70 to 77 years.1–3,6 The incidence of IOP elevation varied widely (10% to 53%) because of the variability in definition of IOP elevation, frequency/technique of IOP measurements, length of follow-up, drug dose, and selection criteria. Jonas and associates implicated younger patient age as a risk factor; but did not actually evaluate young patients (mean age, 70 to 74 years) to draw this conclusion.3,4 Notwithstanding the scarce data on post-IVTA IOP profile in younger age groups, multicenter trials on IVTA are recruiting patients ≥ 18 years of age.5

Unlike us, most authors do not consider ocular hypertension, history of steroid-induced glaucoma, or medically controlled open-angle glaucoma as contraindications for IVTA, though these conditions predispose to greater IOP spikes and optic nerve damage.1–4,6 Repeated steroid injections, employed in many of these studies, further enhance the risk for IOP rise.6 We therefore restricted ourselves to a single injection of IVTA.

The study had certain limitations. The number of young patients (≤ 45 years) was too small to definitively comment on their pressure response. The postoperative IOP profile in various age groups was assessed at the same endpoint (six months) for consistency in comparison. Because of this time confinement, we might have missed the late IOP spikes. Further, we did not recruit patients according to preset age groups, though we achieved balanced groups when dividing the enrolled patients age-wise.

Corticosteroids induce ocular hypertension by increased outflow resistance, through structural changes in the trabecular meshwork, reduced endothelial phagocytosis, and increased extracellular matrix deposition.7 Innately higher endogenous cortisol levels probably make younger patients more vulnerable to these effects of exogenous steroids. Our study found that the main concern while injecting younger patients with IVTA is a greater frequency of IOP elevation; the severity of this complication and its response to treatment remain similar to that in the older patients.

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REFERENCES


The Risk of Endophthalmitis Following Intravitreal Triamcinolone Injection in the DRCRnet and SCORE Clinical Trials

Abhish R. Bhavsar, Michael S. Ip, Adam R. Glassman, for the DRCRnet and the SCORE Study Groups

PURPOSE: To report the incidence of endophthalmitis following intravitreal injection using a standardized injection procedure.

DESIGN: Two randomized clinical trials.

METHODS: Nonpreserved intravitreal triamcinolone acetonide in prefilled syringes (Allergan, Inc, Irvine, California, USA) was injected intravitreally in the Diabetic Retinopathy Clinical Research Network (DRCR net) and the Standard Care vs Corticosteroid for Retinal Vein Occlusion (SCORE) clinical trials. The standardized injection procedure did not include the use of topical antibiotics during the days prior to the injection.

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From Retina Center, PA, Minneapolis, Minnesota (A.R.B.), University of Wisconsin-Madison, Madison, Wisconsin (M.S.I.); and Jaeb Center for Health Research, Tampa, Florida (A.R.G).

Inquiries to Adam R. Glassman, Jaeb Center for Health Research, 15310 Amberly Drive, #350, Tampa, FL 33647; e-mail: aglassman@jaeb.org