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Triamcinolone-assisted vitreous imaging using B-scan ultrasonography

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PURPOSE. *To evaluate the echographic vitreoretinal patterns before and after intravitreal injection of triamcinolone (IVTA) in eyes with opaque media and several pathologies.*
METHODS. *One eye with pseudophakic cystoid macular edema and two eyes with postoperative endophthalmitis and opaque media were examined using B-scan ultrasonography, before and after 0.1 mL ITVA (4 mg Kenacort). The obtained images were compared and the two eyes with endophthalmitis underwent pars plana vitrectomy (PPV) the same day. The relationship between intraoperative and echographic findings was evaluated.*
RESULTS. *Vitreous was relatively anechoic in all three cases before ITVA. Postinjection examination improved visualization of vitreous and posterior hyaloid face (PHF) and revealed vitreoretinal adhesions. The echographic findings confirmed intraoperatively in the two vitrectomized eyes.*
CONCLUSIONS. *Triamcinolone-assisted ultrasonography enhances imaging of the PHF. This method might be useful in cases with opaque media regarding PPV planning and prognosis. It is suggested to be applied in selected cases taking into account the beneficial diagnosis information versus the risks to IVTA application. (Eur J Ophthalmol 2008; 18: 1028-30)*

KEY WORDS. *Intravitreal triamcinolone, B-scan, Posterior hyaloid face*

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INTRODUCTION

The preoperative identification of vitreoretinal adhesions and extent of vitreous detachment is important for every vitreoretinal surgeon to schedule a prompt surgical procedure. The posterior hyaloid face (PHF) can be adequately examined by means of biomicroscopy and optical coherence tomography (OCT) unless the media are not transparent. Intravitreal triamcinolone (IVTA) is widely used as a treatment modality for diabetic macular edema, retinal vein occlusion, age-related macular degeneration, and pseudophakic cystoid macular edema (1). IVTA has been also applied during pars plana vitrectomy (PPV) in order to enhance the visualization of the vitreous cortex (2) and to facilitate manipulations close to vitreoretinal interface (3). We experienced an improved visualization of the vitreous and better delineation of the PHF during real time B-scan ultrasonography after routine use of IVTA in various retinal disorders. In the following case series we evaluated ultrasonographically posterior vitreous status before and after a single IVTA injection and compared the echographic data with the intraoperative findings during the PPV.

Case reports

This is a prospective observational small case series including three eyes from three patients receiving 4 mg intravitreal triamcinolone acetonide (Kenacort-A, Bristol-Myers Squibb). All injections were performed by the same surgeon in the operation theater, under local anesthesia, in the lower temporal quadrant. The standard technique (draping, use of solution of povidone iodine 10% before and after injection) was applied in all eyes. The three eyes were examined using real time B-scan ultrasonography (Ultrascan imaging system, Alcon) 1 hour before and 1 hour after injection, by the same operator. The two endophthalmitis cases underwent PPV the same day.

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Case 1

A 65-year-old man with diabetic macular edema in his left eye was scheduled for IVTA treatment. Preoperative examination using real time B-scan ultrasonography (Fig. 1A) showed a relatively anechoic vitreous. Detection of the PHF could not be achieved. After an IVTA injection the ultrasonographic reexamination revealed clearly a thick vitreoretinal adhesion (Fig. 1B).

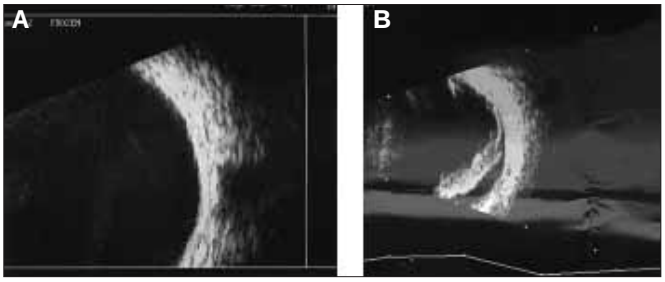

Fig. 1 - *In Case 1, patient examined with B-scan before IVTA, and vitreous was relatively anechoic* (**A**, top left). *After a single dose of IVTA, a thick PHF adhesion was revealed* (**B**, top right).

Case 2

A 66-year-old man presented with acute onset postcataract endophthalmitis in his left eye. The initial visual acuity was hand motion. The opaque media did not allow fundus examination. The real time B-scan ultrasonography showed a relatively anechoic vitreous, despite the intraocular inflammation (Fig. 2A). After IVTA injection, a posterior vitreous detachment (Fig. 2B) was ultrasonographically identified. The echographic finding was confirmed during PPV. Minimal retinal edema without hemorrhages or vessel sheathing implied a mild retinal inflammation. A complete removal of the vitreous cortex was performed without intraoperative complications.

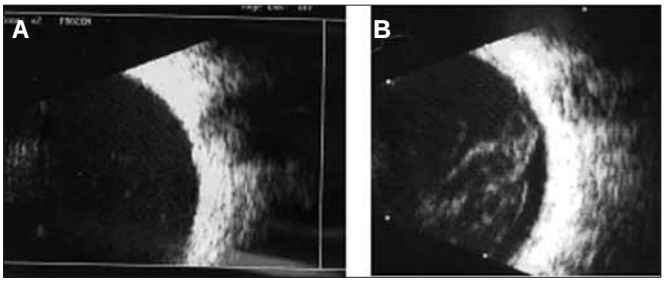

Fig. 2 - *In Case 2, B-scan examination before IVTA revealed a relatively anechoic vitreous* (**A**, top left). *After a single dose of IVTA, a complete PVD was revealed* (**B**, top right), *which was confirmed during surgery.*

Case 3

A 62-year-old woman presented with acute onset endophthalmitis in her right eye, 20 days after cataract surgery. Anterior membrane formation and vitreous inflammation obstructed the fundus view. Echographically, although the vitreous appeared highly reflective, the PHF could not be well defined (Fig. 3A). After IVTA assisted real time B-scan ultrasonography, a strong vitreoretinal attachment was detected (Fig. 3B), and during PPV confirmed. The intraoperative identification of retinal hemorrhages and exudation indicated the severity of the retinal involvement. Incomplete removal of the cortex was preferred primarily, in order to avoid further retinal damage.

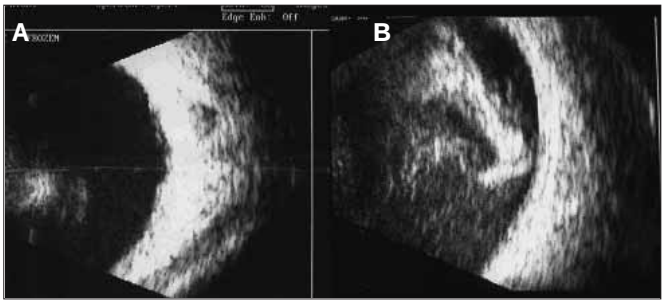

Fig. 3 - *In Case 3, B-scan examination revealed an anechoic vitreous* (**A**, top left) *and after a single IVTA injection a strong vitreoretinal adhesion was revealed* (**B**, top right).

DISCUSSION

The separation between the PHF and the internal limiting membrane is clinically manifested as a partial or total posterior vitreous detachment (PVD). PVD is implicated in several disorders of the vitreoretinal interface. Since the early 1960s, continuous developments (4, 5) in ophthalmic ultrasound improved the imaging of delicate and relatively anechoic structures, such as the normal vitreous. However, in clinical practice, a delineation of the PHF cannot be routinely achieved by means of real time B-scan ultrasonography. In this case series we demonstrated the significant difference in distinguishing the PHF with the real time B-scan ultrasonography after application of one dose IVTA. The property of triamcinolone to reflect ultra-

sound has been described after posterior sub-Tenon injection (6). To our knowledge, IVTA as adjunct enhancement in the relatively anechoic vitreous environment has not been reported. We suggest that this method might be helpful in case of opaque media, as in endophthalmitis or in trauma.

IVTA-assisted B-scan ultrasonography can reveal a PVD or vitreoretinal adhesions, which may determine the surgical approach and influence the prognosis. Particularly in case of an inflamed or injured retina the indication to remove complete vitreous cortex is not well established. Detection of a total PVD encourages the surgeon to prompt removal of cortex with fewer maneuvers close to the retina and consequently less risk for iatrogenic breaks.

In Case 2, the detection of a total PVD after IVTA-assisted ultrasonography allowed the surgeon to remove the cortex thoroughly without complications from the underlying inflamed retina. On the contrary, the identification of thick or multiple vitreoretinal adhesions, as demonstrated in Case 3 with endophthalmitis, alerts the surgeon to anticipate a more complex surgery. Manipulations close to the vitreoretinal interface increase the risk to injure the already stressed retina. A thorough removal of the cortex might be primarily avoided.

Kenacort-A (Bristol-Myers Squibb) is a commercially available suspension of active ingredients of triamcinolone acetonide together with inactive ingredients (carboxymethylcellulose and polysorbate 80) (7), stable in the usual temperature (25ºC). As already reported the safety profile of the drug is high and injection-related complications are rare. However, we prefer to perform IVTA-assisted B-scan ultrasonography in selected cases. Increase of intraocular pressure does not seem to be a limitation of the method because of the short intravitreal exposure of triamcinolone up to the following vitrectomy.

In conclusion, triamcinolone-assisted ultrasonography enhances imaging of the PHF. This method might be useful in cases with opaque media regarding PPV planning and postoperative prognosis. It is suggested to be applied in selected cases taking into account the beneficial diagnostic information versus the risks of IVTA application.

The authors have no proprietary interest.

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REFERENCES

1. Jonas BJ, Kreissig I, Degenring R. Intravitreal triamcinolone acetonide for treatment of intraocular proliferative, exudative and neovascular diseases. Progr Retin Eye Res 2005; 24: 587-611.
2. Payman GA, Cheema R, Conway MD, et al. Triamcinolone acetonide as an aid to visualization of the vitreous and posterior hyaloid during pars plana vitrectomy. Retina 2000; 20: 554-5.
3. Enaida H, Hata Y, Ueno A, et al. Possible benefits of triamcinolone-assisted pars plana vitrectomy for retinal diseases. Retina 2003; 23: 764-70.
4. Mundt G, Hughes W. Ultrasonics in ocular diagnosis. Am J Ophthalmol 1956; 41: 488-98.
5. Sebag J. Imaging vitreous. Eye 2002; 16: 429-39.
6. Freeman WR, Green RL, Smith RE. Echographic localization of corticosteroids after periocular injection Am J Ophthalmol 1987; 103(3 Pt1): 281-8.
7. Chou DK, Krishnamurthy R, Randolph TW, Carpenter C, Manning MC. Effects of Tween 20(R) and Tween 80(R) on the stability of albutropin during agitation. J Pharm Sci 2005; 94: 1368-81.