Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Ophtalmology

Irvine-Gass Syndrome: Clinical, Therapeutic and Progressive Aspects (A Series of 100 Eyes)

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DOI: 10.36347/sjmcr.2023.v11i04.056 | **Received:** 12.03.2023 | **Accepted:** 19.04.2023 | **Published:** 23.04.2023

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Abstract **Original Research Article**

Postoperative macular oedema (MO), better known as Irvine-Gass syndrome, remains an important cause of visual acuity loss (VAL) after cataract surgery. Macular oedema (MO) is a thickening of the macular retina due to the accumulation of fluid and proteins in retinal tissue. Irvine Gass syndrome is a type of MO that can complicate cataract surgery. The frequency of occurrence of Irvine-Gass is significantly increased in case of capsular rupture or diabetic, uvetic context surgery or a history of venous occlusion. This is a descriptive study involving 100 eyes operated on for cataracts by phacoemilification in the adult ophthalmology department of the Avicenne Marrakech Military Hospital. The purpose of this work is to study the epidemiological profile, clinical, paraclinical, therapeutic and evolutionary aspects of MO after phacoemulsification.

Keywords: Cataract surgery, Phacoemulsification, Cystoide macular oedema, Serous retinal detachment, Anti-inflammatory treatment, IVT of Anti-VEGF, IVT of corticosteroids.

INTRODUCTION

Postoperative macular oedema (MO), better known as Irvine-Gass syndrome [1, 2], remains an important cause of visual acuity loss (VAL) after cataract surgery. The purpose of this work is to study the epidemiological profile, clinical, paraclinical, therapeutic and evolutionary aspects of MO after phacoemulsification.

PATIENTS AND METHODS

This is a descriptive study (March 2018 - April 2019) involving 100 eyes operated on for cataracts by phacoemilification in the adult ophthalmology department of the Avicenne Marrakech Military Hospital. Patients with diabetic retinopathy, uvetic context or a history of central retinal vein occlusion (CRVO) were excluded from the study. All patients received a complete preoperative ophthalmological examination and a postoperative ophthalmological examination on D1, D7, D30 and then at 3 months and 6 months with a retinal angiography and a macular OCT in case of clinical suspicion of MO. The resolution of cystoid macular oedema was defined as the complete disappearance of retinal cysts, retinal thicken and subretinal fluid, and also as improved visual acuity. The average follow-up is 6 months.

RESULTS

Among the 100 eyes included, 9 patients had a postoperative MO. The average age of patients is 62 years (5 women and 7 men). Among these 9 patients, we found a rupture of the posterior capsule with issue of vitreous in 6 patients, two of whom were secondarily implanted by an implant with iriac fixation, a zonular disinsertion in one case, and a phacoemulsification without incidents in two cases. Clinically all patients had a VAL on average two months after the surgical procedure. The diagnosis was confirmed by macular OCT +/- retinal angiography. The treatment consisted at the first line on oral carbonic anhydrase inhibitors, NSAIs and topical corticosteroids. 2 patients received an intravitricular injection of triamcinolone. 1 patient had recurrent macular oedema and received an intravitreal injection of 0.7 mg dexamethasone. The evolution was good for 8 patients with improvement in the best average corrected visual acuity from 0.7± 0.1 logMAR (20/100) to 0.3 ± 0.02 (20/25) logMAR at 6 months and a reduction in central macular thickness from 580.16 µm to 244.7 ± 25.6 microns.

DISCUSSION

- Macular oedema (MO) is a thickening of the macular retina due to the accumulation of fluid and proteins in retinal tissue.
- Irvine-Gass syndrome is a type of MO that can complicate cataract surgery [3-6, 15].
- The frequency of occurrence of Irvine-Gass syndrome is significantly increased in case of capsular rupture or diabetic, uvetic context surgery or a history of venous occlusion [7-10].

❖ **Physiopathology:**

The inflammatory origin seems to be the most likely:

Cataract surgery

- **Arachidonic acid**
- **Pro-inflammatory cytokines**
- **Lysosymes**
- **VEGF**

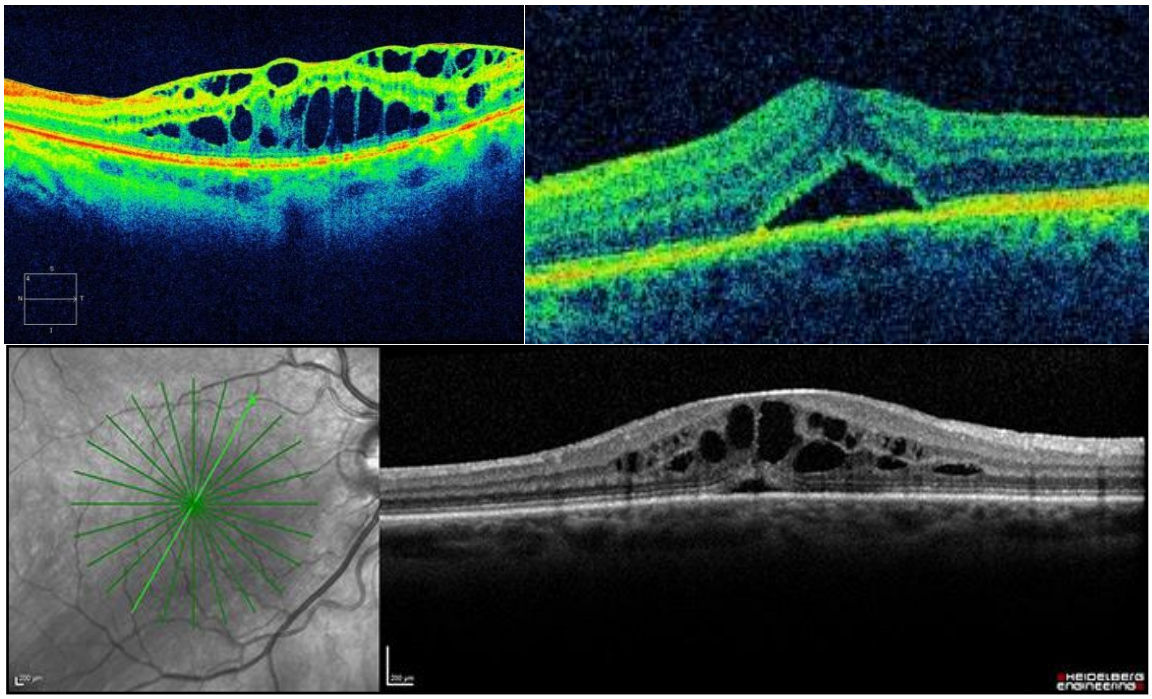
- **Alteration of HRB and HAB** [11]
- **Increased vascular permeability** [11, 12]

The mechanical origin: anterior traction of the vitreous on the macular area [13].

The appearance of phacoemulsification has significantly decreased these tensile forces compared to extra-capsular extraction techniques, also explaining the decrease in the CMO incidence with the improvement of surgical techniques [6, 14].

What can the OCT show?

- Thickening without exudation [16]
- Diffused MO, confirmed by fluoresceine angiography [17]
- Cystoid MO
- SRD



❖ **Treatment:**

1/ Preventive treatment:

Using anti inflammatory drops made of NSAIs and corticosteroids, may reduce the incidence of Irvine-Gass Syndrome by limiting post-surgical inflammation [18]:

- Flurbiprofen: 1 drop / 4h * 5 weeks
- Nepalenac: 3 times /day * 8 weeks
- Ketorolac: 1 to 2 drops 4 to 6 times / day * 21 days (19)
- Indomethacin: 4 to 6 times / day (to be started 24 hours before surgery) * 6 weeks (20)
- The diclofenac: 3 to 5 times /day * 4 weeks.

In case of predisposing context or risk factors, it is essential to also treat the cause:

1. *Stopping prostaglandin-based eye drops.*
2. *The balancing of diabetes and blood pressure.*
3. *Control of inflammation in a patient with uveitis is necessary.*
4. *In case of ischaemic venous occlusion, treatment of ischaemia by pan-photocoagulation must be carried out during the preoperative period, in order to limit inflammation and then Irvine Gass syndrome.*
5. *+/- IVT of corticosteroids.*

2/Curgative treatment:

In first intention:

It is usual to use a therapeutic combination including oral out-of-label administration of acetazolamide (Diamox®) [21] and topical administration of NSAIs [22, 24].

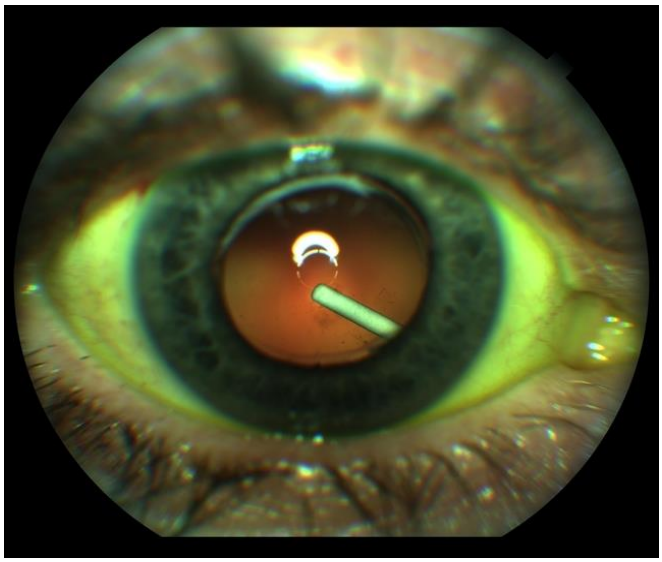
Dosage: Varies from 1⁄4 tablet 4 times a day to 3 tablets of 250 mg a day of acetazolamide, most often with a gradual decrease over one to three months.

In 2nd intention:

◉ The administration of corticosteroids in the treatment of Irvine Gass syndrome is common:

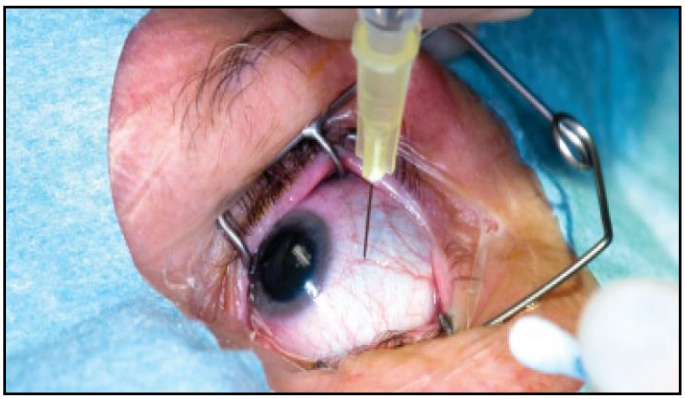
- The administration of triamcinolone, excluding marketing authorisation, as subconjunctival injection is effective.
- Triamcinolone IVTs, excluding marketing authorisations, have also shown their effectiveness in the treatment of the CMO [26].
- Corticoid implant (OZURDEX) is a biodegradable implant delivering 700 µg of Dexamethasone in the vitreous. Its efficiency has been demonstrated in a study including 27 patients with post-surgical Irvine-Gass syndrome [27].

◉ However, recurrences are common between 6 weeks to 3 months with variable effectiveness of reinjections (limited indication) [28].



In practice, it seems reasonable to wait three months before performing the first IVT

The same applies to intolerance or contraindication to acetazolamide with ineffectiveness of eye drops NSAIs.



Anti-VEGF IVTs can be used in case of failure or contraindication to the IVT of corticosteroids [29, 30].

- **Surgical treatment may be necessary in case of capsular rupture with vitreous outcome.**
- **Performing a previous vitrectomy associated with the injection of Triamcinolone during cataract surgery with capsular rupture reduces the risk of CMO** [31].

CONCLUSION

Irvine-Gass syndrome remains an unforgected etiology of VAL after cataract surgery. The surgical procedure must be as accurate as possible and preventive treatment must be codified and systematic.

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