Enucleation/Evisceration in Endophthalmitis

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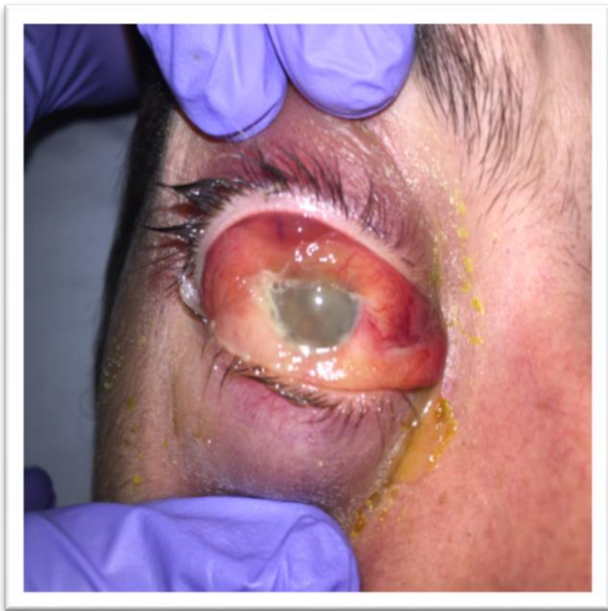
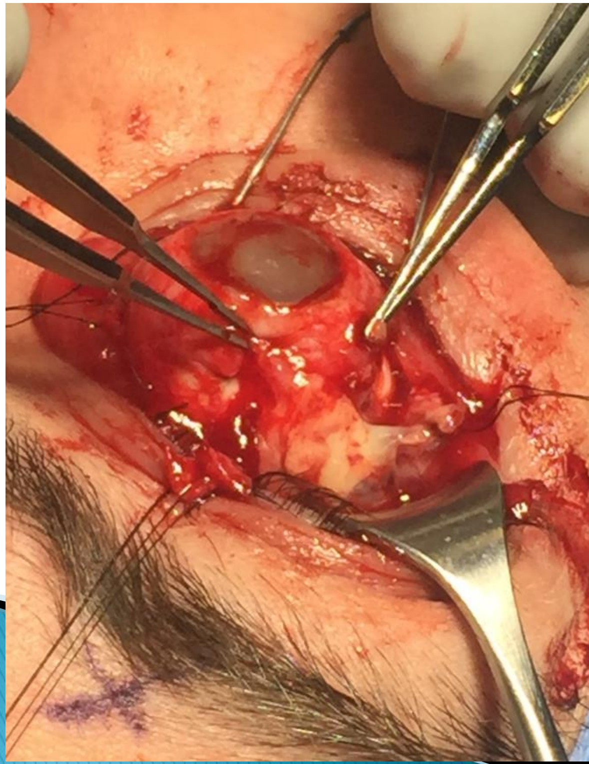
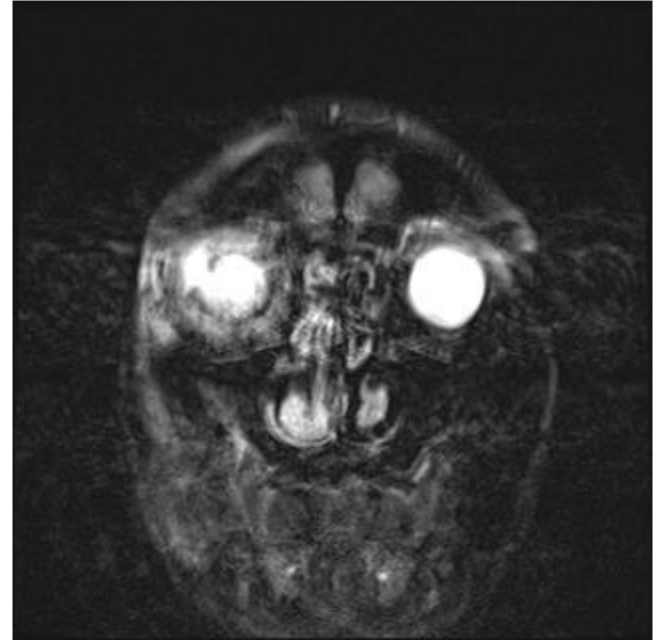
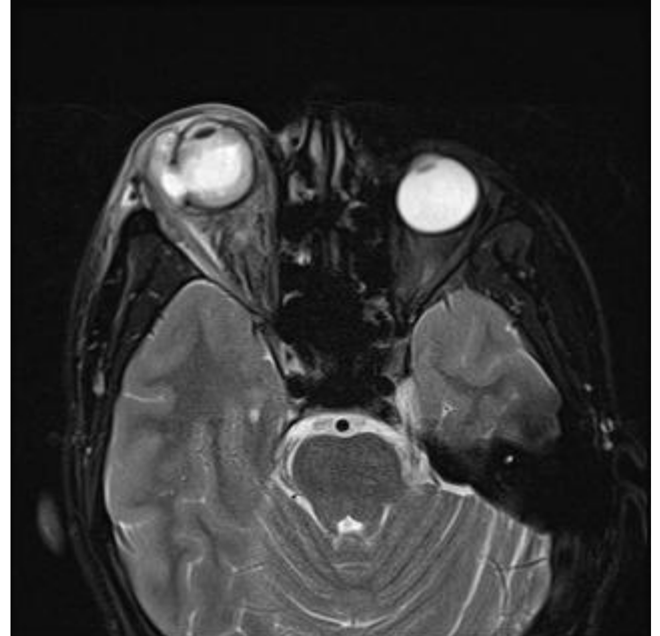
Disclosure

- No relevant financial relationships

Treatment options

- Systemic antibiotics
- Intravitreal antibiotics injection
- Removal of eye (8.1–73%)
  - Enucleation
  - Evisceration
- Implants
  - Primary
  - Secondary

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Endophthalmitis Vitrectomy Study

- Applies to post cataract surgery patients
- Va ≥LP
  - PPV with IVT antibiotics
- VA<LP
  - Vitreous tap & IVT antibiotic

Prevention of Evisceration or Enucleation in Endogenous Bacterial Panophthalmitis with No Light Perception and Scleral Abscess

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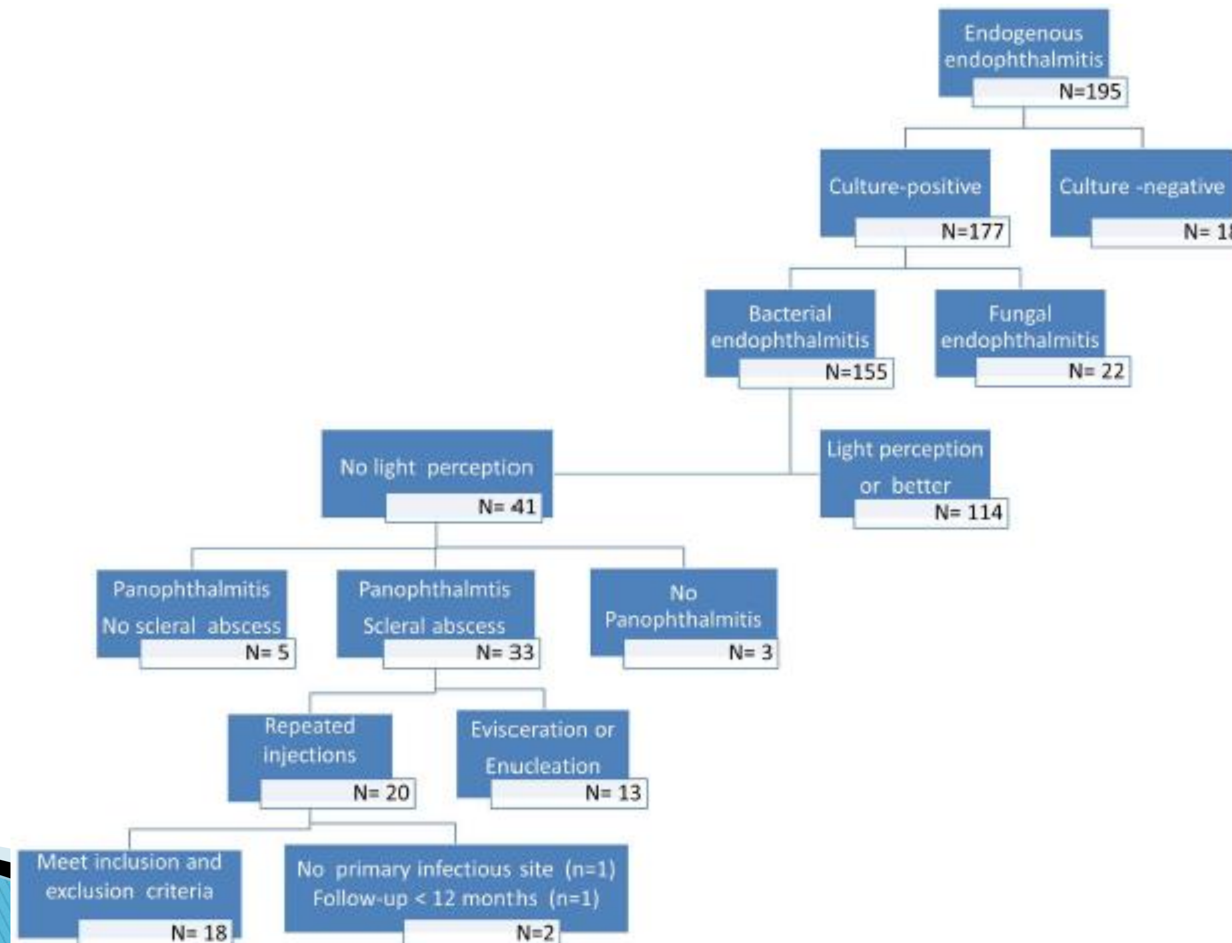
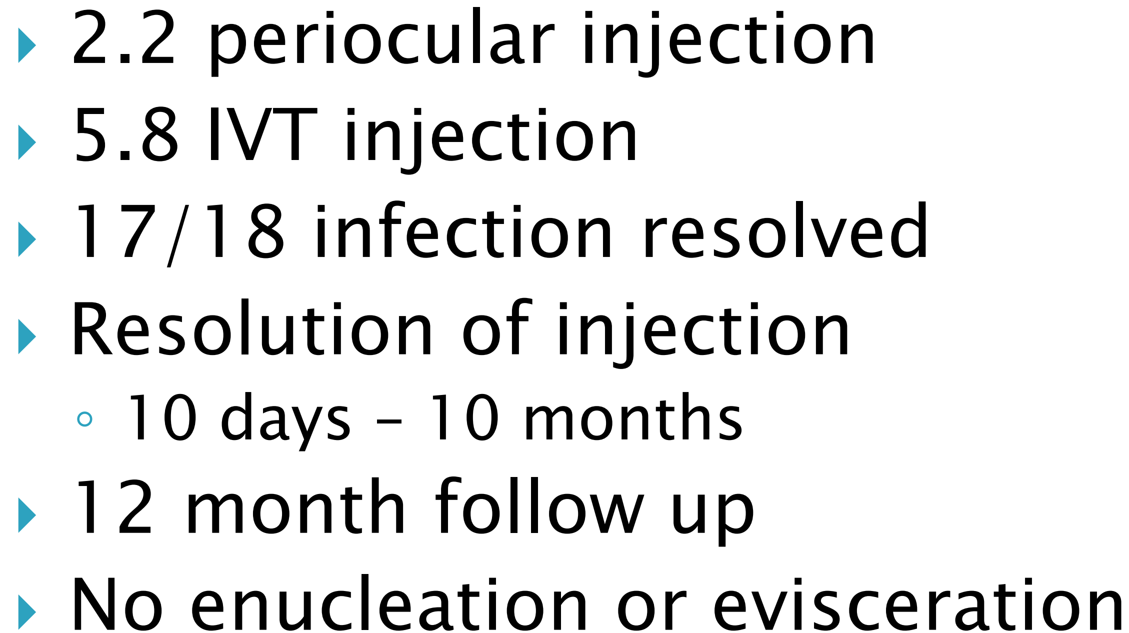


- Systemic antibiotics
- Ceftazadime or Vanc
- Dexamethasone
- Injected in quadrants around area of abscess
- Careful IVT until leakage without prolapse of tissue
- Volume
    - 0.1-0.3mL (with corneal lac/infiltrate)
    - 0.3-0.5mL
    - 0.3-1mL (1-2 quadrants)
- Injection every 48-72 hrs x 1-2 wks
- 2x/week then weekly

Patient No.	Gender/ Age/ Eye	Cause	Organism	Cultures B/P/E	Corneal ring-shaped infiltration	Systemic antibiotics	Primary antibiotics	Secondary antibiotics	No. of periocular injections	No. of intravitreal injections
1	M/84/ OD	Pneumonia	*Pseudomonas aeruginosa*	+/NA/+	-	CAZ	CAZ	CAZ	2	5
2	M/84/ OD	Liver abscess	*Klebsiella pneumoniae*	+/+/+	-	CRO	CAZ	CAZ	2	6
3	F/45/OD	Pyelonephritis	*Escherichia coli*	-/+/+	+	CRO	CAZ	CAZ	2	6
4	M/46/ OS	Liver abscess	*Klebsiella pneumoniae*	+/NA/+	-	CRO	CAZ	CAZ	2	6
5	F/66/OS	Liver abscess	*Klebsiella pneumoniae*	+/+/+	-	CRO	CAZ	CAZ	3	10
6	M/84/ OD	Mycotic pseudoaneurysm	*Streptococcus agalactiae*	+/-/+	-	PCN	VAN+CAZ	VAN	2	4
7	F/48/OD	Cellulitis	*Staphylococcus aureus*	+/+/+	-	OXA	VAN+CAZ	VAN	2	5
8	F/53/OD	Liver abscess	*Klebsiella pneumoniae*	+/NA/+	-	CRO	CAZ	CAZ	2	5
9	M/70/ OD	Liver abscess	*Klebsiella pneumoniae*	+/+/-	+	CRO	CAZ	CAZ	3	7
10	F/50/OD	Renal abscess	*Klebsiella pneumoniae*	+/+/+	-	CRO	CAZ	CAZ	2	4
11	M/67/ OS	Retroperitoneal (nonrenal) abscess	*Klebsiella pneumoniae*	+/+/+	-	CRO	CAZ	CAZ	2	5
12	M/39/ OS	Drug abuse	*Klebsiella pneumoniae*	+/+/+	+	CRO	VAN+CAZ	CAZ	2	4
13	M/58/ OD	Liver abscess	*Klebsiella pneumoniae*	-/+/+	-	CRO	CAZ	CAZ	3	10
14	F/51/OD	Pyelonephritis	*Klebsiella pneumoniae*	+/+/-	-	CRO	CAZ	CAZ	2	5
15	F/78/OD	Liver abscess	*Klebsiella pneumoniae*	+/-/-	+	CRO	CAZ	CAZ	2	6
16	M/70/ OD	Liver abscess	*Klebsiella pneumoniae*	+/+/-	+	CRO	CAZ	CAZ	3	8
17	F/84/OS	Pneumonia	*Streptococcus agalactiae*	+/NA/-	-	CRO	VAN+CAZ	VAN	2	5
18	M/72/ OD	Infective endocarditis	*Streptococcus pneumoniae*	+/NA/+	-	VAN+CRO	VAN+CAZ	VAN	2	4

B, blood; CAZ, ceftazidime; CRO, ceftriaxone; E: eye; NA, not available; OXA, Oxacillin; P, primary infectious source; PCN, penicillin; VAN, vancomycin



- 2.2 periocular injection
- 5.8 IVT injection
- 17/18 infection resolved
- Resolution of injection
  - 10 days – 10 months
- 12 month follow up
- No enucleation or evisceration

Treatment options

- Systemic antibiotics
- Intravitreal antibiotics injection
- Removal of the eye (8.1-73%)
  - Enucleation
  - Evisceration
- Implants

Evisceration

- Pro
  - Retain scleral tissue (if applicable)
  - Lower rate of implant extrusion
  - Shorter surgery time
  - Less post operative inflammation
  - Better prosthesis motility
- Con
  - Risk of sympathetic ophthalmia

Enucleation

- Pro
  - Removal of infection in entirety
  - Decrease risk of sympathetic ophthalmia
- Cons
  - Requiring larger implants
  - Extrusion of implants
  - Less prosthesis motility
  - Longer surgical time
  - Higher post operative inflammation
  - Risk for meningitis and encephalitis (pre-abx era)

Treatment options

- Systemic antibiotics
- Intravitreal antibiotics injection
- Removal of the eye (8.1%)
  - Enucleation
  - Evisceration
- Implants
  - Primary
  - Secondary

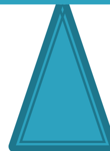
Implants

Primary

- All-in-one surgery
- Less duration of pain & anxiety
- Shorten hospitalization
- Earlier prosthesis fitting

Secondary

- Lessen risk for meningitis, encephalitis
- Less exposure, extrusion



Evisceration

Dresner SC, Karesh JW. Primary implant placement with evisceration in patients with endophthalmitis. *Ophthalmology* 2001;107:1661–4.

- 11 pts
- 67-84 yo
- 7 prior ocular surgery
- 4 corneal ulceration
- 64% + culture
- 9 porous polyethelene implant
- 2 methylmethacrylate
- 1 exposure (MMA)

Evisceration with primary implant placement in patients with endophthalmitis
Tawfik HA, Budin H
Ophthalmology. 2007 Jun;114(6):1100-3. Epub 2007 Jan 29.

- METHODS:
- A retrospective study was conducted to review the files of 67 patients with endophthalmitis who underwent evisceration with primary implant placement over an 8-year period. These patients' files were reviewed to evaluate the following: persistent infection and inflammation, spread of infection to contiguous or remote sites, implant exposure or extrusion, and successful fitting of the prosthesis.
- RESULTS:
- Sixty-three patients successfully retained their primary implant with rapid resolution of infection and inflammation. In 1 patient, attempts at implant placement were abandoned during surgery because of marked scleral necrosis. Delayed implant extrusion was noted in 2 patients, 10 and 12 days after surgery, respectively. In 1 diabetic patient, an orbital abscess developed that was evacuated with implant exchange. In a fourth patient, marked conjunctival prolapse developed in the early postoperative period with eventual obliteration of the inferior fornix. The patient declined further management. Minor complications included a central conjunctival dehiscence or necrosis (n = 2) and a pyogenic granuloma that was excised (n = 1). All minor complications healed without sequelae. Overall, 12 % of patients experienced complications (n = 8).

Enucleation With Primary Implant Insertion for Treatment of Recalcitrant Endophthalmitis and Panophthalmitis

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Methods: In a retrospective interventional case series, 22 consecutive patients with advanced endophthalmitis or panophthalmitis refractory to prior medical treatment underwent enucleation and primary implant placement by a single surgeon between 1991 and 2001. Eleven patients received hydroxyapatite implants; 11 patients received silicone implants. All patients were treated during surgery with intravenous antibiotics. All patients were evaluated for persistent local or systemic infection, implant exposure, extrusion, and successful fitting of their prostheses.

Results: No cases of persistent orbital cellulitis or meningitis occurred in any of the patients. Two patients with silicone orbital implants had extrusions; one was successfully managed with a secondary dermis-fat graft, and another patient who refused additional treatment was allowed to heal by secondary intention after the implant was removed. None of the patients with hydroxyapatite orbital implants had complications. All patients (20/20) who elected to undergo prosthetic fitting were successfully fit with prostheses. One patient elected not to pursue prosthetic fitting. One patient died of unrelated causes before a prosthesis could be fit. There were no objective findings to preclude successful fitting in either case.

TABLE 1. *Patient characteristics and possible predisposing conditions to enucleation*

Patient	Age	Sex	Prior ocular surgery/VA*	Ocular*/Medical history
1	84	M	None/BLP	HSV keratitis, corneal perforation/sterile endocarditis
2	74	M	None/NLP	Corneal ulcer/non-Hodgkin lymphoma
3	56	M	None/NLP	NVG, corneal ulcer/none
4	81	F	ICCE, PPV, PRP/BLP	Corneal ulcer, glaucoma, PDR/DM
5	43	F	PKP/BLP	Corneal ulcer, optic neuritis/AIDS
6	23	M	SBP/BLP	Recent blunt ocular trauma, infected SB/none
7	80	M	None/NLP	Corneal perforation with uveal prolapse/none
8	59	F	ECCE, PKP/NLP	HSV keratitis, glaucoma/none
9	78	M	ECCE/NLP	Corneal ulcer/none
10	66	M	PPV/NLP	None/multiple myeloma, pericarditis, *Clostridium* bacteremia, gas gangrene
11	84	M	Corneal perforation repair with GF/BLP	Corneal perforation/none
12	83	F	ECCE, PKP, PPV/BLP	PBK, corneal perforation/none
13	78	F	ECCE, PKP/NLP	Corneal ulcer and perforation/none
14	87	M	ECCE, SBP, ruptured globe repair/NLP	RD, corneal ulcer and perforation, ruptured globe/CVA
15	69	M	None/NLP	None/DM, COPD, *Staphylococcus aureus* uremia, endocarditis
16	82	F	PKP/NLP	Failed corneal graft, corneal perforation, glaucoma/none
17	72	M	ECCE, PKP ×2, TRAB ×2, Ahmed valve/NLP	Failed corneal graft, corneal ulcer, glaucoma/CHF, hypertension
18	85	M	ECCE, PKP, PPV, Ruptured globe repair/NLP	Retinal detachment, corneal ulcer, ruptured globe/DM, gout
19	77	M	ECCE/NLP	PBK, corneal ulcer, NVG, CRAO/DM, cardiomyopathy, hypertension
20	78	F	None/NLP	Corneal ulcer/hypertension
21	84	M	None/NLP	Corneal ulcer/COPD, pneumonia, *Streptococcus* bacteremia, meningitis
22	81	M	None/NLP	Corneal ulcer and perforation/squamous cell carcinoma of scalp, frontal sinus, and dura

TABLE 2. *Implant type, culture results, and complications of 22 patients who underwent enucleation and primary reconstruction with implant insertion*

Patient	Date of surgery	Implant	Ocular culture	Orbital culture	Orbital biopsy	Complications
1	6/12/91	Hydroxyapatite	*S. pneumoniae*	None	None	None
2	8/30/91	Silicone	*P. aeruginosa*	No growth	No organisms	None
3	11/7/91	Silicone	*P. aeruginosa*	None	None	Extrusion
4	1/10/92	Hydroxyapatite	*P. aeruginosa*	No growth	No organisms	None
5	4/6/92	Hydroxyapatite	*S. aureus*	None	None	None
6	6/4/92	Silicone	*S. aureus*	No growth	No organisms	None
7	9/30/92	Silicone	*P. aeruginosa*	None	None	None
8	11/19/92	Hydroxyapatite	*P. aeruginosa*	None	None	None
9	2/4/93	Hydroxyapatite	*P. aeruginosa*	None	None	None
10	4/13/93	Hydroxyapatite	*C. septicum*	None	None	None
11	8/11/93	Hydroxyapatite	*S. pneumoniae* *S. aureus*	No growth	No organisms	None
12	11/19/93	Hydroxyapatite	*P. aeruginosa*	No growth	No organisms	None
13	10/20/94	Hydroxyapatite	*S. pneumoniae* *S. aureus*	No growth	No organisms	None
14	5/17/95	Hydroxyapatite	*S. pneumoniae*	*S. pneumoniae*	Organisms S. aureus	None
15	2/20/96	Silicone	*S. aureus*	No growth	No organisms	None
16	3/13/98	Hydroxyapatite	*No growth*	No growth	No organisms	None
17	1/29/99	Silicone	*S. pneumoniae*	No growth	No organisms	None
18	2/11/99	Silicone	*No growth*	No growth	No organisms	None
19	5/21/99	Silicone	*P. aeruginosa*	No growth	No organisms	None
20	8/13/99	Silicone	*S. pneumoniae*	No growth	No organisms	None
21	3/15/00	Silicone	*S. pneumoniae*	S. pneumoniae	Organisms	Extrusion
22	1/18/01	Silicone	*S. aureus*	No growth	No organisms	None

S. pneumoniae, Streptococcus pneumoniae; P. aeruginosa, Pseudomonas aeruginosa; S. aureus, Staphylococcus aureus; C. septicum, Clostridium septicum.

A COMPARISON OF IMPLANT EXTRUSION RATES AND POSTOPERATIVE PAIN AFTER EVISCERATION WITH IMMEDIATE OR DELAYED IMPLANTS AND AFTER ENUCLEATION WITH IMPLANTS

BY Don Liu MD

Trans Am Ophthalmol Soc 2005;103:568-591

Methods: This prospective, nonrandomized interventional case series included four groups of patients: group 1, 25 endophthalmitis patients undergoing evisceration with immediate implants; group 2, 15 endophthalmitis patients undergoing evisceration with delayed implants; group 3, 31 patients without endophthalmitis undergoing evisceration with immediate implants; and group 4, eight patients undergoing enucleations with implants. Standardized techniques and follow-up schedules were used. Postoperative pain was assessed by weighted frequency of pain medications used during two 48-hour periods. Statistical analysis was performed. Retrospective review of two series of patients undergoing evisceration was performed.
Results: No cases of implant extrusion occurred during an average follow-up of 37.9 months. Average implant size was 19.0 mm. Conjunctival dehiscence occurred in one patient. Average total pain scores were 20.8 in endophthalmitis patients with immediate implants; 22.1 in endophthalmitis patients with delayed implants; 20.3 in patients without endophthalmitis and with immediate implants; and 23.1 in patients with enucleations and immediate implant insertions. Retrospective review suggested possible causes of implant extrusion.

	Evisceration with primary implant	Evisceration with secondary implant
Number of patients	25	15
Follow up (mean)	40-51 months (43.7)	22-39 months (27)
Implant material	PMMA	PMMA
Implant size (mean)	14-20 mm (18.3)	16-20 mm (18mm)
Complication	1 conjunctival dehisence	

Secondary Orbital Ball Implants After Enucleation and Evisceration: Surgical Management, Morbidity, and Long-Term Outcome

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Methods: The study is a case series analysis of the clinical charts of 110 consecutive patients who underwent secondary ball implantation after enucleation or evisceration, from January 1998 to December 2011, under the care of 1 surgeon. Patients undergoing primary evisceration and implant exchange were excluded. Primary surgery was due to trauma in 48.8% patients, endophthalmitis and phthisis bulbi in 25.6%, tumors in 22.1%, and orbital vascular malformations in 3.5%. This study adheres to the principles outlined in the Declaration of Helsinki.

Results: Of 110 identified cases, 24 were excluded for insufficient follow-up (less than 2 years); mean follow-up was 6.4 years. Group A patients (previously enucleated) received a polyglactin mesh-wrapped implant. Group B patients (previously eviscerated) kept their own sclera as a secondary anterior capping on the polyglactin mesh-wrapped implant. There were 2 implant exposures (4.9%; 2 of 41) in group A. Hard palate graft was used to repair the exposed implant successfully. No exposure was noted in group B. No statistically significant between-group difference in exposure rate was found.

TABLE 1. Demographic characteristics and complications

	Group A enucleated (n = 41)	Group B eviscerated (n = 45)	Total (n = 86)
Age (average/range)	50.4 (30–69)	50.7 (27–69)	50.2 (27–69)
Gender (M:F)	29:12	37:8	66:20
Follow-up periods (y)	2–15	2–15	2–15
Mean follow-up (y)	6.4	6.3	6.4
Implant size (diameter)			
18 mm	14	13	36
20 mm	22	26	39
22 mm	5	6	11
Implant exposure	2 (4.9%)	0	2 (1.7%)
Conjunctival dehiscence	0	2 (4.4%)	2 (1.7%)

TABLE 2. Etiology

	Group A enucleated (n = 41)	Group B eviscerated (n = 45)	Total (n = 86)
Trauma	17 (41.46%)	25 (55.56%)	42 (48.8%)
Eye tumor	19 (46.34%)	—	19 (22.1%)
Orbital vascular malformation	2 (4.88%)	1 (2.22%)	3 (3.5%)
Pan/endophthalmitis	1 (2.44%)	6 (13.33%)	7 (8.1%)
Phthisis bulbi (multiple previous surgeries)	2 (4.88%)	13 (28.89%)	15 (17.5%)

Complications associated with secondary orbital implantations.
Sundelin KC1, Dafgård Kopp EM.
Acta Ophthalmol. 2015 Nov;93(7):679-83. doi: 10.1111/aos.12818.
Epub 2015 Aug 20

- **METHODS**: A retrospective review was made of the records of patients who had undergone a secondary orbital implantation at a tertiary referral centre at St Erik Eye Hospital in Stockholm, Sweden, from 1998 up to and including the first half of 2009. Implant-related complications were noted as was demographic and surgical background data. The regional ethics committee in Stockholm gave its approval for this study.
- **RESULTS**: Seventy-one patients had received a secondary orbital implant at the eye hospital. Implant-related complications were noted in 24 patients (34%), and 20 patients required reoperation/s (28%). There were five types of complications: migration of the implant (13%), insufficient orbital volume (10%), exposure/extrusion/infection (8%), mechanical obstruction (1%) and socket oedema (1%). Analyses of sizes and types of implants, wrapping and surgical techniques did not reveal any specific factor that resulted in an increased number of complications. However, there was an indication that aluminium oxide might be associated with fewer complications (2/11 = 18%).

Summary