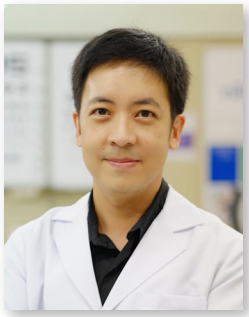
Thai J Ophthalmol 2562;33(2):59-65.

Original Article/นิพนธ์ต้นฉบับ

Factors Associated with Orbital Implant Exposure or Extrusion after Enucleation or Evisceration in Chiang Mai University Hospital



Sakarin Ausayakhun, MD[1]

Saralai Yoosamran, MD[1]

Abstract

Objective: To determine the factors that can be associated with orbital implant exposure or extrusion after enucleation or evisceration in patients who came for treatment in Chiang Mai University Hospital.

Methods: Retrospective review of medical records with diagnoses of orbital implant exposure or extrusion between January 2009 and December 2015.

Results: Orbital implant exposure was slightly predominant in evisceration (16 in 26 sockets, 61.5%), while orbital implant extrusion was mainly seen in enucleation (13 in 17 sockets, 76.5%). Causes that led to evisceration or enucleation were most commonly infection (18 in 43 sockets, 41.9%) and trauma (11 in 43 sockets, 25.6%). Glass implants had the highest percentage of implant complications (39 in 43 sockets, 90.7%) of implant materials. The most commonly used sizes of orbital implants were No.16 (32.6%) and No.18 (32.6%), and the most common type of suture was combined polyglactin (Vicryl®) with polyester (Surgidac™) (22 in 43 sockets, 51.2%). Orbital implant exposure or extrusion occurred mainly in operations performed by residents of ophthalmology (28 in 43 sockets, 65%).

Approved from the IRB of Faculty of Medicine, Chiang Mai University: (Research ID: 3805/Study code: OPT-2559-03805)

Conflict of interest: *None*

[1]*Department of Ophthalmology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand*

Conclusion: Orbital implant extrusions in enucleation occurred more frequently than in evisceration, but orbital implant exposure occurred slightly more frequently in evisceration. Glass implant materials are presumed to have more implant complications than other materials. The most common orbital implant sizes were No. 16 and No. 18. The suture type used most commonly was combined polyglactin with polyester.

Key words: orbital implant, enucleation, evisceration, implant extrusion, implant exposure

บทคัดย่อ

ปัจจัยที่มีความสัมพันธ์กับการโผล่หรือการหลุดของ orbital implant หลังผ่าตัดลูกตาออกในโรงพยาบาลมหาวิทยาลัยเชียงใหม่

ศักรินทร์ อัษญคุณ, พ.บ.[1], สราลัย อยู่สำราญ, พ.บ.[1]

[1]ภาควิชาจักษุวิทยา คณะแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่

วัตถุประสงค์: เพื่อหาปัจจัยที่มีผลต่อการโผล่หรือการหลุดของ orbital implant หลังผ่าตัดลูกตาออก ของผู้ป่วยที่มารักษาในโรงพยาบาลมหาวิทยาลัยเชียงใหม่

วิธีการวิจัย: การศึกษาข้อมูลย้อนหลังของเวชระเบียนที่ได้รับการวินิจฉัยว่ามีการโผล่หรือการหลุดของ orbital implant หลังผ่าตัดลูกตาออก ระหว่างเดือนมกราคม 2552 และธันวาคม 2558

ผลการวิจัย: การโผล่ของ orbital implant พบมากเล็กน้อยหลังผ่าตัดลูกตาออกแบบ evisceration (16 ใน 26 เบ้าตา, 61.5%) ในขณะที่ การหลุดของ orbital implant ส่วนใหญ่พบหลังผ่าตัดลูกตาออกแบบ enucleation (13 ใน 17 เบ้าตา, 76.5%). สาเหตุที่นำไปสู่การเอาลูกตาออกทั้ง แบบ evisceration หรือ enucleation พบมากที่สุดคือการติดเชื้อ (18 ใน 43 เบ้าตา, 41.9%) และการบาดเจ็บ (11 ใน 43 เบ้าตา, 25.6%) วัสดุที่ทำจากแก้ว อาจถือได้ว่ามีภาวะแทรกซ้อนมากกว่าชนิดอื่น (39 ใน 43 เบ้าตา, 90.7%) ขนาดของ orbital implants ที่ใช้บ่อย คือ เบอร์ 16 (32.6%) และ เบอร์ 18 (32.6%), และชนิดของวัสดุที่ใช้เย็บแผลส่วนใหญ่ คือ ส่วนผสมของ polyglactin (Vicryl®) กับ polyester (Surgidac™) (22 ใน 43 เบ้าตา, 51.2%). การโผล่หรือหลุดของ orbital implant ส่วนใหญ่ทำโดย แพทย์ประจำบ้านจักษุวิทยา (28 ใน 43 เบ้าตา, 65%).

Conclusion: การหลุดของ orbital implant พบบ่อยในการผ่าตัดลูกตาออกแบบ enucleation แต่การโผล่ของ orbital implant พบบ่อยในการผ่าตัดลูกตาออกแบบ evisceration วัสดุที่ทำจากแก้วมีปัญหามากกว่าชนิดอื่น ขนาดของ implant ที่พบบ่อยคือ เบอร์ 16 และเบอร์ 18. ชนิดของวัสดุที่ใช้เย็บแผลส่วนใหญ่ คือ ส่วนผสมของ polyglactin กับ polyester

คำสำคัญ: Orbital implant, enucleation, evisceration, implant extrusion, implant exposure

ได้รับอนุมัติจากคณะกรรมการจริยธรรมวิจัยในคน เลขที่ Research ID: 3805/Study code: OPT.2559-03805)

ความเกี่ยวข้องหรือผลประโยชน์ของผู้นิพนธ์กับผลิตภัณฑ์ที่กล่าวถึงในบทความ *ไม่มี*

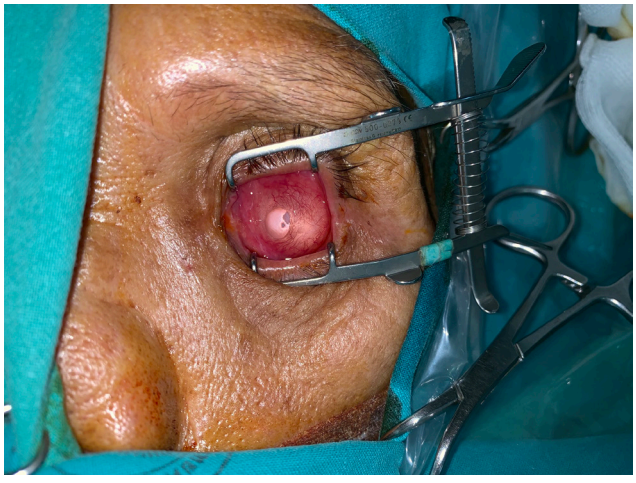
Introduction

Enucleation and evisceration are procedures used for the treatment of several ocular conditions including intraocular malignancy, severe ocular trauma, and severe infections that do not respond to medication treatment.[1] The aim of enucleation and evisceration is to remove the affected globe to save the patient's life or to save the fellow

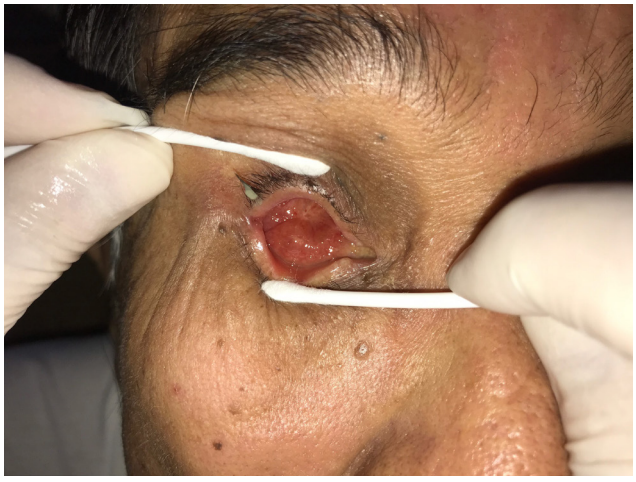
eye from sympathetic ophthalmia.[2] At the time of surgery, an orbital implant is usually inserted to replace the volume in the orbit and to create a good functional socket that is necessary for well fitted eye prosthesis subsequently. Following enucleation and evisceration, an acrylic or silicone conformer is placed to cover the conjunctiva in order to maintain the conjunctival fornix space that will support the eye prosthesis. The eye prosthesis is fitted within 4-8 weeks after enucleation or evisceration for cosmetic appearance.[3]

An adequate orbital implant will provide an effective functional socket for the eye prosthesis. So, the orbital implant is very important for the patient's quality of life after surgery. There are several materials used to create orbital implants. In the past, implant materials were limited to glass, gold, and silver. Then, there were many developments in both the type of material used and the structure of orbital Implants to increase their efficacy. Currently, the selection of implant materials includes glass, silicone, acrylic, rubber, steel, gold, silver polymethylmethacrylate (PMMA), hydroxyapatite and porous polyethylene. In addition, pegged orbital implants have developed to prevent migration and extrusion of the implants.[4]

Postoperative complications of enucleation and evisceration include deep superior sulcus, shallowness of conjunctival fornix, contracted socket, anophthalmic ectropion, exposure and extrusion of the orbital implant. Exposure and extrusion of orbital implants are significant post-operative complications because they affect the fitting of the eye prosthesis and may also lead to infection.[5-7] The factors that may be associated with exposure and extrusion of orbital implant include infection, type of implant material, size of the implant, wrapping material used, pegging, surgical technique used and the surgeon's experience.[8,9] This study aimed to review the factors that were associated with orbital implant exposure or extrusion after enucleation or evisceration in patients who were treated at Chiang Mai University Hospital.



Orbital implant exposure



Orbital implant extrusion

Methods

The present study was reviewed and approved by the Faculty of Medicine, Chiang Mai University Review Board (Research ID: 3805 /Study code: OPT-2559-03805). We retrospectively reviewed the medical records of those patients diagnosed with "exposure or extrusion orbital implant" who came for treatment at Chiang Mai University Hospital between January 2009 and December 2015. They received enucleation or evisceration at Chiang Mai University Hospital or at other hospitals in northern Thailand and were referred for treatment these complications.

The medical records of these patients were reviewed to obtain the following data: demographics, time of complication was diagnosed, causes of enucleation or evisceration, type of implant, type and size of implant, surgeon, and the presence of infection before exposure or extrusion of orbital implants. All patients had the orbital implant inserted at the time of enucleation or evisceration and had no evidence of other postoperative complications except orbital implant extrusion or exposure. They all received appropriate surgical management such as implant reposition, re-implantation, scleral patch graft, amnion patch graft, posterior sclerotomy with implantation exchange, or dermis fat graft at Chiang Mai University Hospital.

Results

Of the 43 patients (43 sockets) who were diagnosed with "exposure or extrusion orbital implant", there were 23 patients (53.5%) after enucleation, and 20 patients (46.5%) after evisceration. The main indications for enucleation or evisceration were infection (18 in 43, 41.9%), which included panophthalmitis, endophthalmitis, and severe corneal ulcer. Other causes were trauma, tumor, and miscellany. The demographic characteristics of the patients are shown in Table 1.

Orbital implant exposure was found predominantly in evisceration (16 in 26, 61.5%). While orbital implant extrusion was mainly in enucleation (13 in 17, 76.5%). The time of diagnosis of orbital implant exposure or extrusion

Table 1 Demographic characteristics of the patients

	Enucleation (n=23)	Evisceration (n=20)	Total (n=43)
Gender			
Male	16	14	30
Female	7	6	13
Age			
≤15	4	1	5
16-60	16	12	28
>60	3	7	10
Underlying diseases			
DM	-	3	3
CVD risk	3	4	7
Connective tissue disease	-	2	2
Laterality			
Right	11	12	23
Left	12	8	20
Indication for surgery			
Infection	8	10	18
Trauma	8	3	11
Tumor	4	-	4
Miscellany	3	7	10

after surgery within 1 month, during 1 month to 1 year, and more than 1 year was 16, 11, and 16 sockets, respectively. At the time of diagnosis, 13 sockets (30.2%) had signs and symptoms of infection (including orbital pain, abnormal discharge, injected conjunctiva, chemosis and periorbital swelling), however, 30 sockets (69.8%) had no signs or symptoms of those infections (Table 2).

The type of orbital implant was predominantly glass ball (39 sockets, 90.7%) compared to hydroxyapatite (4 sockets). The most commonly

Table 2 Summary of clinical data of eyes with orbital implant exposure or extrusion

	Enucleation N	Evisceration N	Total N
Type			
Exposure	10	16	26
Extrusion	13	4	17
Time of diagnosis			
<1 month	10	6	16
1 month – 1 year	4	7	11
>1 year	9	7	16
Infection			
Yes	11	2	13
No	12	18	30
Type of implant			
Glass	20	19	39
Hydroxy-apatite	4	-	4
Size of implant			
No. 14	3	2	5
No. 16	6	8	14
No. 18	7	7	14
No record	7	3	10
Type of suture			
Polyglactin	7	2	9
Polyester	-	2	2
Polyglactin+Polyester	9	13	22
No record	7	3	10
Surgeon			
Ophthalmology residents	14	14	28
General ophthalmologists	2	-	2
Oculoplastic ophthalmologists	-	1	1
No record	7	5	12

used sizes of orbital implants were No.16 (32.6%) and No.18 (32.6%), and the most common type of suture was combined polyglactin with polyester (22 in 43 sockets, 51.2%). The orbital implant exposures or extrusions were performed mainly by ophthalmology residents (65%). A Summary of the clinical data of eyes with orbital implant exposure or extrusion is shown in Table 2.

Discussion

From this retrospective study, the numbers of orbital implant extrusions are much higher in enucleation than in evisceration, but orbital implant exposure was slightly predominant in evisceration.

The orbital implant material that had the highest percentage of implant complications was glass. However, the likely reason why we see higher rate of complication among glass implants compared to porous implants is because the prevalence of glass implant use is significantly higher than porous implants among eye surgeons in Thailand. Therefore, it can be presumed that the rate of complications in glass implant would be seen more frequently than that of porous implants. Moreover, in a previous study there were significant associations with the orbital implant materials and their wraps, the exposure rates were significantly higher in porous implants[3,5,7,8] and also porous with peg possibly increased the number of complications.[7-8] The reason for our different findings may be due to the fact that glass implants are predominantly used in our country and porous implants are rarely used.

Infection and trauma were the primary indications for evisceration or enucleation. This may be explained by the infection process which can lead to tissue melting and trauma can result in destruction of normal anatomy and tissue, so the socket could be susceptible to further complications.

We also expected that infection after evisceration or enucleation would be an important factor that would lead to orbital implant exposure or extrusion. But from the findings of this study, there were only 13 sockets out of 43 sockets that showed signs of infection (abnormal discharge, injected conjunctiva, chemosis and periorbital swelling). One possible reason is most patients paid little attention to the socket (because there was no eye), so they did not visit the hospital for treatment. Topical antibiotics are easy to access from drugstores in this country. The patients usually go to the hospital when their complications are more serious such as implant exposure or extrusion, and the signs of infection may be absent at that time due to prior self-prescribed antibiotic treatment.

The number of implant exposures and extrusions were mainly in sockets that were operated on by residents of ophthalmology. This indicates that the surgeon's experience is associated with orbital implant exposure or extrusion. In contrast, a previous study reported that the experience of the surgeon was not associated with these complications.[6] However, almost all of the evisceration and enucleation procedures in our hospital were performed by residents of ophthalmology, so this may be a sampling bias.

This study is limited by its retrospective nature and some of the medical record information was incomplete. The number of sockets included in this study is small and may not reflect the actual association between risk factors and complications. Another limitation would be that it was a single-center study. A longitudinal cohort study with more patients included should be done to confirm the actual factors associated with orbital implant exposure or extrusion after enucleation or evisceration.

References

1. Viswanathan P, Sagoo MS, Olver JM. UK national survey of enucleation, evisceration and orbital implant trends. Br J Ophthalmol 2007;91:616-9.
2. Aryasit O. Indications for enucleation and evisceration. Songkla Med J 2012;30:115-21.
3. Custer PL, Kennedy RH, Woog JJ, Kaltreider SA, Meyer DR. Orbital Implants in enucleation surgery: a report by the American Academy of Ophthalmology. Ophthalmology 2003;110:2054-61.
4. Moshfeghi DM, Moshfeghi AA, Finger PT. Enucleation. Surv Ophthalmol 2000;44:277-301.
5. Oestreicher JH, Liu E, Berkowitz M. Complications of hydroxyapatite orbital implants. A review of 100 consecutive cases and a comparison of Dexon mesh (polyglycolic acid) with scleral wrapping. Ophthalmology 1997;104:324-9.
6. Sami D, Young S, Petersen R. Perspective on orbital enucleation implants. Surv Ophthalmol 2007;52: 244-65.
7. Yazici B, Akova B, Sanli O. Complications of primary placement of motility post in porous polyethylene implants during enucleation. Am J Ophthalmol 2007; 143:828-34.
8. Wang JK, Liao SL, Lai PC, Lin LL. Prevention of exposure of porous orbital implants following enucleation. Am J Ophthalmol 2007;143:61-7.
9. Chalasani R, Poole-Warren L, R. Conway RM, Ben-Nissan B. Porous orbital implants in enucleation: a systematic review. Surv Ophthalmol 2007;52:145-55.