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STUDY OF OUTCOME OF MINIMALLY INVASIVE SURGERY IN PRIMARY RHEGMATOGENOUS RETINAL DETACHMENT

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ABSTRACT

Title: To study the outcome of minimally invasive surgery in primary rhegmatogenous retinal detachment.
Aim: Prospecutive evaluation of 30 cases of minimally invasive retinal detachment surgery(MIDS) in primary retinal detachment with respect to vision and fundus over a period of one year after surgery irrespective of age, sex and etiology.
Method: 30 patients with primary rhegmatogenous retinal detachment were evaluated completely with respect to vision, anterior segment and posterior segment. All underwent external retinal detachment surgery with application of cryotheraphy around break followed by application of radial or circumferential sponge to the break.Patients were observed daily in ward by indirect ophthalmoscopy for 7 days and then were followed up regularly in opd after 1 week,3 week,6 week and 3 month. Case in which retina was not settled was termed as failed case.
Result: Out of 30 patients, 23 patients has successful anatomical retinal reattachment while 7 required revision surgery in the form of sclera buckling with subretinal fluid drainage. Of the 7 patients who needed revision surgery 6 cases were due to a missed break or non localization of break, while 1 case had an inferior tractional band which was treated with vitrectomy and silicon oil. All 7 patients settled after second surgery.
Conclusion: MIDS surgery is treatment of choice in uncomplicated rhegmatogenous retinal detachments in which retinal breaks or a hole is the only cause of detachment. The success of this surgery lies largely with accurate preoperative localization of break, the number, position and size of break. Also absence of drainage puncture decreases the frequency of intra and postoperative associated complication.

KEYWORDS

INTRODUCTION:
Retinal detachment is defined as separation of the neural retina from the retinal pigment epithelium due to fluid collection between the two layers. Accumulation of subretinal fluid is a common feature of all types of retinal detachments.

Types of retinaldetachment-1)Rhegmatogenous –occurs due to full thickness retinal hole or break with well defined vitreous traction. Fluid from vitreous cavity enters the subretinal space through the break.2)Tractional retinal detachment caused due to vitreoretinal fibroproliferative membrane which pulls the retina mechanically away from underlying retinal pigment epithelium.3)Exudative detachment-caused by retinal or choroidal conditions that distrubs the retinal pigment epithelieum or the blood retinal barrier allowing fluid to seep into the subretinal space.

The various methods employed for management of rhegmatogenous retinal detachment can be divided into pneumatic retinopexy, sclera buckling with or without drainage, vitreous surgery and MIDS(minimally invasive detachment surgery without drainage).

Pneumatic retinopexy-is a minimally invasive surgical technique in which intravitreal gas injection with either cryopexy or laser and post operative patient positioning is done.Best result of this surgery are achieved in acute retinal detachments, acute phakic single break and small clusters of breaks in superior 8 clock hours of fundus or in patients of glaucoma with tube and shunt devices where buckle cannot be used.Success rateof this surgery is limited.

Sclera buckling(encirlage) with drainage-consisted of (a) Treatment of break with cryotheraphy, (b) Encirclage by buckles-reduces traction on the break and volume reduction by concentrating the vitreous mass both facilitating apposition of retina and plugging of tears.

Indication of encirclage with drainage-1)Total bullous Retinal Detachment not responding to complete bed rest.2)Multiple breaks of similar latitude.3)Retinal Detachment with anterior proliferative vitreoretinopathy.4) Need of higher and more permanent buckle.5)Thin sclera which interferes with suturing and failed segmental buckles.

Drainage of subretinal fluid helps in bringing the neuroepithelium into apposition and makes space for volume reduction that is essential for encircling.Also shortens recovery time as the retina is flattened on table ensuring surgeons ease and shortens hospital stay.

Complicationsof Encirclage-1)Encirclage requires treatment in all four quadrants irrespective of break location.2)Causes refractive changes(myopia).3)Motility and alignment disturbances.4)Presence of permanent intraocular foreign body with risk of infection, transconjunctival (external) extrusion and rarely transcleral (internal) erosion.5)String and purse string syndrome.6) Choroidal ischaemia.7) Reduced pulse amplitude.

Complicationof Drainage:1)Hemorrhage(intraocular).2)Choroidal detachment.3)Retinal incarceration.4)Choroidal edema.5) Macular pucker.

Vitrectomy-
Indication-1)Vitrous heamorrhage, vitreous opacities, posterior uveitis, asteroid hyalosis which interferes with proper preoperative visualization of fundus and detection of breaks require vitrectomy.2) Largeposterior retinal breaks in high myopia, coloboma and staphyloma.3) Large posterior retinal tear associated with lattice.4)Failed pneumatic retinopexy, subretinal gas, giant retinal tears, RD with PVR grade D.5) RD with open globe injury.

Advantages-1) Improves visualisation of fundus decreasing

possibility of missing retinal breaks.2)Patient is free of floaters as traction on the tear isfreed.3)On table flat retina with no subretinal fluid due to use of gas or siliocon oil.

Disadvantages-1)Can cause new retinal breaks and unexplained visual field defect.2)In phakic eye it causes post operative progression of nuclear cataract requiring second surgical treatment.3) Risk of endophthalmitis.

Minimally invasive retinal detachment treatment (minimal segmental buckle without drainage/MIDS)

Is an extraocuar surgery for repair of primary rhegmatogenous retinal detachment in which the buckle and coagulation are limited to the area ofbreak. It is thus a change from treatment of areaof detachment to the area of break.

This technique was first proposed and extensively practiced by INGRID KRESSIG.

MIDS works on principle of Custodis which states that,''After the tearing break is closed the retinal epithelium will pump out the SRF and reattach the retina.''

Custodies technique used a polyvinyl plombe for closing the retinal break and the sclera was treated with full thickness diathermy. However this exceptional technique was abondoned due to serious postoperative complications of scleral abscess caused by polyviol plombe compressed over full thickness diathermised sclera.

In subsequent year Lincoff replaced the polyviol plombe with a tissue inert silicone plombe-'lincoffsponge'.This procedure was called **modified custodies procedure** and is the basis of todays extraocular minimal treatment for primary retinal detachment.In subsequent years the preconditions for this specific break surgery were further improved by better fundus examination using binocular indirect ophthalmoscopy and by using lincoff's rule for detection of leaking breaks in detachment which is a precondition for surgery limited to the area of break.

Orientation of segmental buckles-
Segmental buckles consist of radial, short circumferential or a combination of both. Optimal buckling aims to fit the various sizes and configuration of retinal breaks. Radial buckle is advantageous becauseof-1) Placing the entire break on thebuckle edge.2) Counteracts fish mouthing of break and risk of anterior leakage.3) Provides optimal support for operculum counteracting future traction and risk of anterior leakage.

AdvantagesofMIDS:
- MIDS is an extraocular procedure hence avoids allcomplications of intraocular surgeries like end ophthalmitis, vitreous heamorrhage and complications of SRF Drainage.\
- It can b edone using local or topical anaesthesia.
- MIDS can be done as an outpatient procedure.
- It is a low budget treatment with inexpensive instruments, lesser time and fewer trained personal.
- It can be applied for superior as well as inferior breaks.
- Does not cause any intraocular complications and postoperative head positioning of patient is avoided.
- Identification of missed breaks becomes easier even if the retina is not settled post-operatively .
- With MIDS there is high primary rate of attachment and low redatachment rate.MIDS also ensures optimal recovery ofvisual acuity with decreasing intraoperative and postoperative complications.

Disadvantages-
- MIDS requires intensive preoperative indirect ophthalm oscopic study.
- It is time consuming, requires experienced VR surgeon for finding all breaks.
- It has a steeper learing curve to localize posterior breaks in bullous RD and buckling them without SRF drainage.
- If radial sponge is applied in area of rectus muscle diplopia can occur.
- Exposure or sponge extrusion can occur if conjunctival closure is improper.
- Retina is unattached on table requiring 24 hours or more for spontaneous retinal reattachment.It is thus more tedious and less forgiving for the surgeon.

MATERIAL AND METHOD:
The study was carried out over a period of 1year where in prospective evaluation of 30 cases of minimally invasive retinal detachment surgery(MIDS) in primary retinal detachment was done with respect to vision and fundus irrespective of age, sex and etiology.

Inclusion criteria:- Primary rhegmatogenous retinal detachment with PVR C3 or lesser grade irrespective of their detachment configuration were included.

Exclusioncriteriea: Giant retinal tears, PVR grade more than C3, Revision surgery, Cases with dense media opacities like cataract more than grade 3,vitrous opacities and cases with coexisting glaucoma were excluded.

All patients included in the study were grouped into the followiing grades of PVR as per the Retina society classification.

GRADE	NAME	CLINICAL SIGNS
A	Minimal	Vitreous haze,pigment clumps
B	Moderate	Wrinkling of the inner retinal surface,rolled edges of retinal break,retinal stiffness,vessel tortousity.
C	Marked	Full thickness fixed retinal folds
C-1		One quadrant
C-2		Two quadrant
C-3		Three quadrant
D	Massive	Fixed retinal folds in four quadrant
D-1		Wide funnel shaped
D-2		Narrow funnel shaped
D-3		Closed funnel shaped

After complete ophthalmic evaluation which includes indirect ophthalmoscopy and fundus drawing patients were investigated and posted for surgery after demmed fit for anaesthesia.

Surgical procedure was carried out in LA/GA/standby anaesthesia. Break was accurately localised and external cryotheraphy around the break with application of radial or circumferential sponge to the break was done.Patient were admitted and observed daily in ward by I/O examination for 7 days.On discharge patient were followed up after 1 week,3 week,6 week and then every 3 monthly till one year.

Cases in which retina was not settled postoperatively after 3 weeks were considered as failure cases and were treated with revision scleral buckle and subretinal fluid drainage..

Surgical procedure- Ater suitable anaesthesia,360 degree peritomy was done flush with the limbus in phakic and 2mm along the limbus in pseudophakic patients.vessels were cauterized and the four recti muscles were isolated using 4-0 mersilk.Through indirect ophthalmoscopy the area of break was marked on the sclera with cautery or marking pen and was treated with cryotherapy, adequate reaction was ensured and the area of break was treated with radial or circumferential sponges depending n orientatin of break.Sponges were sutured to sclera with 5-0 dacron sutures. Anterior chamber paracentesis was done and intraocular pressure was checked postoperatively before conjunctival closure. Post operatively patients were started on intravenous broad spectrum antiobiotic for 5 days. Topical treatment for all patients consisted of an antibiotic steroid and anti-inflammatory preparation.

OBSERVATION AND RESULTS:

Table 1:Total No.of patients(N=30)

Age (Years)	Male	Female	Total	Percentage
>10	0	1	1	3.33
10-30	9	5	14	46.7
30-50	5	3	8	26.7
50-70	4	3	7	23.3
Total	18	12	30	100

Table 2:Grades of PVR and No of breaks

PVR grade	Single break	Multiple break	Percentage
A	0	0	0
B	6	2	26.7
C1	5	4	30
C2	4	2	20
C3	4	3	23.33
Total(30)	19	11	100

Table3:Detachment configuration

Detachment configuration	No of cases
Localized RD with macula ON	1
Localized RD with macula OFF	18
Total bullous RD	11

Table 4:preoperative visual acuity

Visual acuity	Total bullous detachment.	Localiseddetachment
<6/60	08	05
6/60-6/24	04	11
6/18-6/12	nil	02
6/9-6/6	Nil	Nil

Table 5:Intraoperative additional procedure

Intraoperative procedure	No.	percentage
Paracentesis	30	100
Muscle disinsertion	02	6.6
Vitreous aspiration	nil	Nil

Paracenesis after scleral suturing of sponge was done in all casesto ensure optimal post operative IOP.Muscle disinserton to seal the underlying break was needed in 2 cases due to the break site below the rectus muscle.

Table 6:sponge orientation

Sponge orientation	No.	Percentage
Circumferential	09	30
Radial	19	63.3
Both	02	6.66

Orientation of sponge was decided based on the position and extent of the break.

Table 7:Postoperative visual acuity at 3 month

Visual acuity	Total bullous detachment.	Localised detachment	total
<6/60	Nil	Nil	nil
6/60-6/24	07	10	17
6/18-6/12	03	07	10
6/9-6/6	Nil	Nil	nil
Total	10	17	27

Three patients lost followup after 2nd month.

Table 8: No. of failure cases 7(Total case-30)

Failure of MIDS is defined as persistence of retinal detachment after 2 weeks of surgery with subretinal fluid level

Cause of failure	No.	Percentage
Missed breaks	06	85.7
Tractional band	01	14.28
PVR	Nil	Nil

Of the seven failure cases, six cases underwent revision scleral buckling with subretinal fluid drainage.One patient who had tractional band underwent vitrectomy with revision surgery.

DISCUSSION:

This study was carried out in a tertiary care hospital where 30 patients of primary rhegmatogenous retinal detachment were diagnosed and treated with minimal invasive detachment surgery. Patients were routinely followed up postoperatively and their vision ,intraocular pressure and retinal status documented on each visit.

In our study of 30 patiients,23patients(76.6%) has successful anatomical retinal reattachment while 7(23.6%) required revision surgery in the form of scleral buckling with subretinal fluid drainage with or without vitrectomy. Out of the 7 patients who needed revision surgery 6 cases (85.71%) were due to missed break or non localisation of the break, while 1 patient out of these patients (14.28%) had an inferior tractional band which was treated with vitrectomy and silicone oil. All patients settled after the second surgery.

Post operatively 17 patients (56.6%) had visual acuity of 6/60-6/23,10 cases(33.3%) had snellens vision of 6/18-6/12. 3 patients (9%) had lost for follow up. All patients had visual acuiy better than preoperative vision. Postoperative vision depends on preoperative macular status, time lag between detachment and treatment and associiated PVR changes.In our study one patien who had macular sparing detachment had a final post operative vision of 6/18 similar to her preoperatiive vision.

In our study 17 patients (56.6%) had single break,11 cases (36.6%) had multiple breaks while in 2 cases (6.6%) breaks could not be localised. Out of the 17 patients with single break 16 patients (94.11%) had settled after one surgery while one patient with single break who had an inferior tractional band was treated with vitrectomy and silicon oil in revision surgery.

Of the 11 patients with multiple breaks, 4 cases(36.6%) required revision surgery due to missed break.In 2 cases out of 30,break could not be localised even after thorough ophthalmoscopic study. In our study of 30 cases ,short circumferential sponge was inserted in 9 eyes while radial sponge was used in 19 eyes.2 cases required both radial and circumferential sponge. Comparable retinal reattachment was achieved in all three groups. In our study horse shoe shaped tears were treated with radial sponges, while round or multiple holes in one quadrant were treated with circumferential sponges. Commonest complication of circumferential sponge isfish mouthing of the retinal break. Thus in our study such sponges were applied only when there were multiple close breaks in less than one quadrant. It is thus the treatment of break rather than the detachment configuration which determines the anatomical success.

Limitation of MIDS

Local vitrous traction band which can prevent successful retinal reattachment is better treated by vitrectomy.In our study 1 patient who required revision surgery had an inferior tractinal band that prevented successful retinal reattachmet.

Multiple breaks in different latitude could be better treated with scleral buckle. Out of 11 patients with multiple breaks 4 patients had breaks in different quadrant and had to undergo scleral buckling as revision surgery.

CONCLUSION:

Success of MIDS depends largely on accurate localisation of break, the number and size of the break and the position of break. The minimal approach is the treatment of choice in uncomplicated rhegmatogenous retinal detachments in which retinal breaks or a hole is the only cause of detachment. The advantage of this minimal technique are decrease in conjunctival and muscle trauma due to buckling lack, lower incidence of postoperative myopization, the risk of post operative inflammation and

subsequent PVR changes also lowered because ofreduced cryopexy. Tthe acceptance of this technique is due to the fact that it is the first surgery that is more respectful of the ocular tissue and less traumatic, which allows the chance of further more invasive surgery if need be. Morever this prcedure has lower frequency of intra and postoperative associated complications.

REFERENCES:

1. Lincoff, Kressig I(2000) Changing patterns in the surgery for retinal detachment:1929-2000
2. Duke-Elder: Systems of Ohthalmology Vol. 10(Detachment and folding of Retina) .
3. Kressing I,Jost B: Minimised surgery for retinal detachment with buckle and non-drainage,a 4 year follow up.Retina 12:224-233.
4. Tornambe PE (1997) Pneumatic retinopexy:the evolution of case selection and surgical technique,Trans Am Ophthalmology society.95:551-578
5. Lincoff H,Kressing I(1974) Reasons for failure in non drainage operations modern ophthalmology 12:40-48
6. Kressig I (2002) A Practical guide to minimal surgery for retinal detachment.Theme publication,New York.
7. Kreissing I (1989)Minimization of detachment surgery klin Augenhilk 195:126-134
8. Kreisig I,Rose D(1989) Scleral buckling without drainage in stage B and C of PVR detachments.