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Outcomes of retinal detachment surgery at Charlotte Maxeke Johannesburg Academic Hospital

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OUTCOMES OF RETINAL DETACHMENT SURGERY AT CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Medicine in the branch of Ophthalmology.

Johannesburg, 2018

DECLARATION

I, Salamina Mathabo Mofokeng, declare that this research report is my own work. It is being submitted for the degree of Master of Medicine in Ophthalmology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

…….day of……..., 2018

DEDICATION

To my late brother, Ishmael Mofokeng, for believing in me.

To my family, for all their love and support.

ETHICS APPROVAL

Ethics approval and permission to conduct the study were obtained from the Human Research Ethics Committee (Medical) at the University of the Witwatersrand.

Clearance certificate number: M141195.

ABSTRACT

Purpose:

The aim of this study was to determine the visual acuity and anatomical outcome of retinal detachment repair at Charlotte Maxeke Johannesburg Academic hospital.

Methods:

Retrospective record review (clinical audit) of outcomes in patients who had retinal surgery (pars plana vitrectomy) for either rhegmatogenous retinal detachment or diabetic retinal detachment (tractional detachment or combined tractional and rhegmatogenous detachment) at Charlotte Maxeke Johannesburg Academic hospital during the period from 1 January 2010 to 31 December 2014.

Results:

During the specified time period 941 pars plana vitrectomies (including repeat surgery) were performed at the hospital. After exclusion for indications other than retinal detachment repairs and for missing or incomplete records, a total of 164 records of 164 patients were reviewed. The patients were divided into two groups: a rhegmatogenous retinal detachment group (n=99) and a diabetic retinal detachment group (n=65).

Rhegmatogenous retinal detachment

Ninety nine patients with rhegmatogenous detachment were included in the study, 62% male and 38% female. The mean age (± standard deviation) was 48(±18.4) years. The most common cause of rhegmatogenous detachment was trauma followed by cataract surgery, accounting for 37 % and 21% of all causes respectively.

Sixty three percent of these detachments involved the macula at the time of presentation, and 58% had proliferative vitreoretinopathy (PVR).

Eighty three eyes (84%) obtained vision improvement or stabilization and retinal attachment. Forty eyes (40%) had visual acuity improvement, 43 eyes (43%) retained the same vision. Successful anatomical reattachment of the retina was obtained in 93% (n=92) of eyes including those that needed a repeat surgery.

Diabetic retinal detachment

Sixty five patients with diabetic retinal detachment were included in the study. Sixty three percent (n=41) were males and the mean age (± standard deviation) was 54± 12.2 years. Sixty eight percent (n=44) had tractional retinal detachment and 32% (n=21) had a combined tractional and rhegmatogenous retinal detachment. Thirty two percent of patients had detachments associated with vitreous haemorrhage, and 60% had macular involving detachments.

Forty six eyes (71%) obtained vision improvement or stabilization and attachment of the retina; 36.9% (n=24) had visual acuity improvement, 33.9% (n=22) retained the same visual acuity and 29.2% (n=19) lost vision. Eighty five percent (n=55) had successful anatomical reattachment of the retina and 15% (n=10) had re-detachments after surgery.

Conclusions:

This study found that the majority of patients, whose files were reviewed, benefited from surgical intervention for rhegmatogenous and diabetic retinal detachment in terms of stabilisation or improvement of vision. The major limitation of this study is the large number of missing or incomplete records. The results of this study are therefore not generalisable to our retinal detachment patient population.

ACKNOWLEDGEMENTS

I am deeply grateful to my supervisor, Dr Aubrey Makgotloe, for his guidance, encouragement and continuous support with the study.

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PREFACE

Retinal detachments are a significant cause of blindness with a devastating impact in our patients' lives, their families and our economy. The two common types of retinal detachments in our population are rhegmatogenous and diabetic tractional retinal detachments

Many studies have been conducted in various parts of the world to analyse the success rates of surgical management of retinal detachments. There are a limited number of published articles that studied the profile of patients with retinal detachment and outcomes of its management in South Africa.

CHAPTER 1 - LITERATURE REVIEW

1.1. Rhegmatogenous retinal detachment

Rhegmatogenous retinal detachment is the most common type of retinal detachment with an incidence ranging from 12.9 to 17.9 per 100 000 people per year.[1] It is caused by accumulation of liquefied vitreous from the vitreous cavity through a retinal tear or hole into the subretinal space. The two conditions required for the development of a rhegmatogenous detachment are a retinal break (or tear) and the liquefied vitreous. The presence of one condition without the other will not cause a detachment.

Risk factors and aetiology

The risk factors associated with rhegmatogenous detachment include retinal degenerations such as myopia with lattice degeneration, cataract surgery and blunt or penetrating ocular trauma.[2,3,4,5] Systemic diseases like Marfan and Stickler syndromes are also risk factors for retinal detachment.

Myopia is a significant contributor amongst all non-traumatic rhegmatogenous detachments.[6,7,8] Compared to emmetropes, the risk of detachment is four times greater in low myopes and 10 times greater in high myopes.[6, 7]

Lattice degeneration is a known predisposing lesion to rhegmatogenous retinal detachment and typically causes atrophic holes or a posterior vitreous detachment with a horseshoe tear, and contributes up to 30% of all predisposing factors to retinal detachment. [7,8]

Cataract surgery is a common procedure performed worldwide and is a very important risk factors for the development of retinal detachment.[6, 7, 9] There is a

fourfold increase in the risk of developing retinal detachment after cataract surgery.[6] A tear in the posterior capsule at the time of cataract surgery has been identified as one of the most significant risk factors for the development of retinal detachment following cataract surgery.[6, 7]

Trauma has been found to be a common cause of rhegmatogenous retinal detachments in young patients.[10]

Outcomes of rhegmatogenous retinal detachment surgery

The success of retinal detachment repair can be measured against functional outcomes (visual acuity) and anatomical outcomes (reattachment rate). In rhegmatogenous detachment the overall anatomic reattachment is between 75% and 95% by scleral buckling or vitrectomy following the first surgery.[2,4,5,8]

Poor anatomical outcomes are seen in detachments associated with large or posterior breaks, trauma, long duration of detachment, and those complicated with proliferative vitreoretinopathy (PVR).[2,3,4,5] The main causes of failure for primary repair or re-detachments are PVR, new break formation and missed or re-opened breaks.[8,9,10]

The functional outcome or visual acuity is determined by the pre-operative visual acuity, the sparing or involvement of the macula, axial length, the type of retinal tear and the duration of the detachment.[8,9] The visual outcome may also be worsened by secondary factors such as macular oedema and epiretinal membrane formation.

Post-operative complications such as endophthalmitis, PVR, macular pucker and diplopia have been reported and may alter the outcome of the surgery.[11]

Rhegmatogenous retinal detachment is a known ocular complication in patients with cytomegalovirus (CMV) retinitis and is related to the extent of the retinitis. The risk of retinal detachment and visual loss from CMV retinitis in immune compromised patients is higher than non-immunocompromised patients. The advent of highly active anti-retroviral treatment has decreased this ocular complication significantly.[12]

In some cases, particularly those with severe PVR, more than one surgical procedure may be required to reattach the retina. Interestingly, this repeated retinal detachment surgery does not seem to influence the anatomical or visual outcomes.[13]

The two common surgical methods for rhegmatogenous retinal detachment repair are scleral buckling and pars plana vitrectomy (PPV).[4]

1.2. Tractional retinal detachment

Tractional retinal detachment occurs when a mechanical force exerted by vitreoretinal adhesions pulls the neural retina away from the retinal pigment epithelium.[14,15,16,17] It is the second most common type of retinal detachment after rhegmatogenous retinal detachment.

Risk factors

The most common cause of tractional retinal detachment is diabetic retinopathy.

Ostri *et al.* listed the following as risk factors for diabetic retinopathy; HBA_1C (Glycosolated Haemoglobin) greater than 7.5mmol, blood pressure greater than 140/90mmHg, diabetes duration, advanced age, male gender and nephropathy.[18]

Diabetic retinopathy is a disease of retinal vessels. Hyperglycaemia causes microvascular occlusion and permeability and eventually hypoxia with ischaemia.[15] Progressive retinal ischaemia leads to the secretion of vascular endothelial growth factor (VEGF). VEGF stimulates neovascularisation and the vitreous serves as a

scaffold where strong vitreoretinal adhesions and fibrovascular bands develop.[14,15,16] Contraction of the fibrovascular bands occurs as fibrosis continues. With time, the vitreous starts pulling away, and a mechanical separation of the neurosensory retina from the underlying retinal pigment epithelium occurs.[14,15,16]

Other known risk factors for tractional retinal detachment are retinal vein occlusion, sickle cell disease, retinopathy of prematurity and penetrating ocular trauma.

Indications for management of tractional retinal detachment are tractional retinal detachment with macular involvement or threatening the macula, combined tractional and rhegmatogenous retinal detachment and tractional retinal detachment associated with chronic, non-clearing vitreous haemorrhage[16, 17]

Outcomes of tractional detachments

Anatomical reattachment rate and an improvement in best corrected visual acuity following surgery has been reported to be as high as 92.8% and 75% respectively in patients with tractional retinal detachment secondary to diabetic retinopathy.[15] Poor prognostic factors for surgery in this setting are poor pre-operative visual acuity, macular detachment, complex fibrovascular membranes, iris neovascularisation and macular ischaemia and oedema.[16]

The rational for conducting this study was to review the patient profile and surgical outcome of retinal detachment surgery in the South African population.

CHAPTER 2 - METHODS

2.1. Study Objectives

- Primary objective: To analyse the visual acuity outcome after at least three months following retinal detachment surgery
- Secondary objective: To analyse the anatomical outcome after at least three months following retinal detachment surgery

2.2. Study Outcome measures

- Primary outcome measure: the change in visual acuity after at least three months following surgery, or three months after the removal of silicone oil (where oil was inserted during the primary surgery)
- Secondary outcome measure: the presence or absence of anatomical reattachment of the retina after at least three months following surgery or three months after the removal of silicone oil (where oil was inserted during surgery)

2.3. Study Methods

2.3.1 Study Design

This was a retrospective, descriptive study of patients who had pars plana vitrectomies (PPVs) for retinal detachment surgery at Charlotte Maxeke Johannesburg Academic hospital between 01/01/2010 and 31/12/2014.

2.3.2 Inclusion Criteria

All patients who had PPVs for retinal detachment surgery for either rhegmatogenous retinal detachment or diabetic retinal detachment were eligible for inclusion in the study.

2.3.3 Exclusion Criteria

Patients with incomplete records were excluded from the study. Patients were also excluded if they had retinal surgery for other indications such as vitreous haemorrhage, macular disorders (macular holes, epiretinal membranes), endophthalmitis, cataract surgery complications other than retinal detachment and intraocular foreign body without retinal detachment.

2.4. Sample size and Statistical analysis

Patients who had PPVs for retinal detachment surgery for either rhegmatogenous retinal detachment or diabetic retinal detachment (including tractional detachment or combined tractional and rhegmatogenous detachment) during the period from 1 January 2010 to 31 December 2014 were included in the study. The results of the two groups were analysed separately.

Descriptive statistics were used to analyse the demographics including the age, race and gender as well as the clinical characteristics such as the aetiology of the retinal detachment.

Success was defined as follows:

1. Anatomical reattachment plus improvement in vision.
2. Anatomical reattachment plus stabilization of vision.

Failure was defined as a re-detachment of the retina and/or vision loss.

The identification of risk factors for failure was performed in a univariate manner with the Student's T Test (two-sided) for continuous data and the Fischer Exact test (two-sided) for categorical data. A p value of <0.05 was considered statistically significant.

CHAPTER 3 - RESULTS

3.1. Total study population

A review of the theatre lists for the specified period identified 853 records for review. Of these, 18.8% of the files were not found, 41% of the records were retinal surgery for indications other than retinal detachments e.g macular holes, and 40% were eligible study population. Only 48% of the eligible study population had complete records for inclusion in the study and 52% had incomplete records for inclusion.

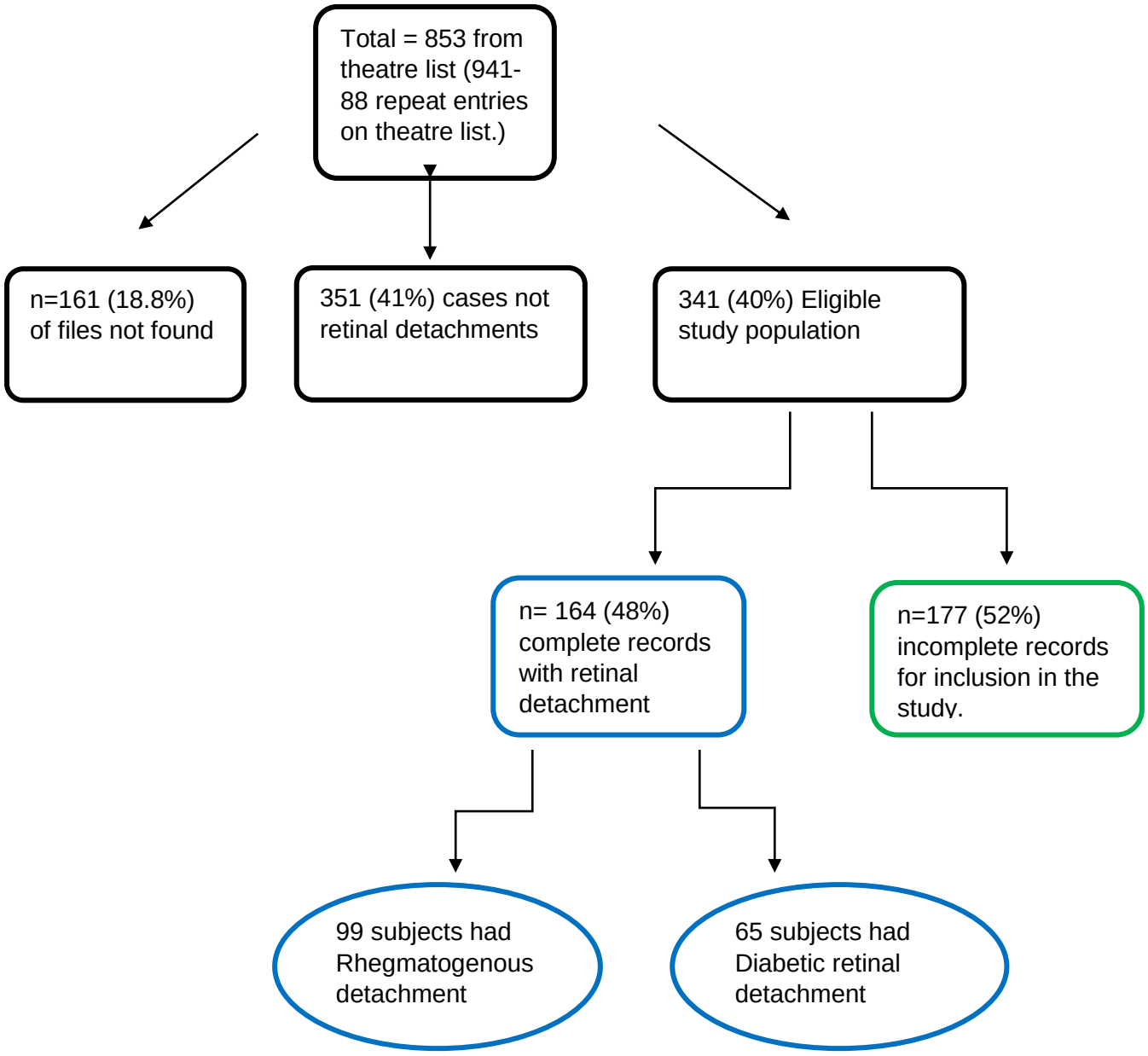


Figure 3.1. Flow diagram of the study population

A total of 164 eyes of 164 patients were included in the final analysis of the results for this study where the records of both the visual acuity and retinal findings could be obtained.

3.2. Racial distribution

Sixty eight percent (112) patients were African, 28%(46) white, 3%(5) Mixed race and 1%(3) Indian (Figure 3.2).

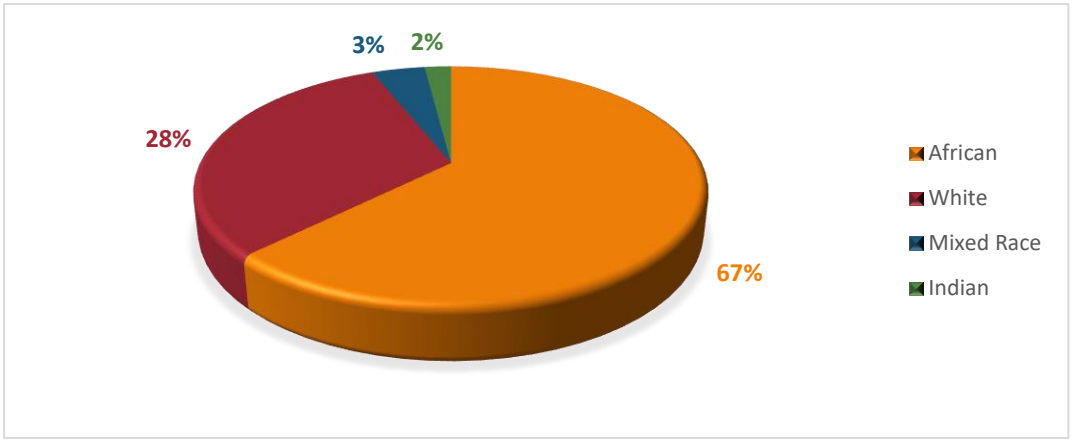


Figure 3.2 Racial distribution of the study population

3.3. Gender distribution

One hundred and two of the 164 patients were male and 62 were female (figure 3.3).

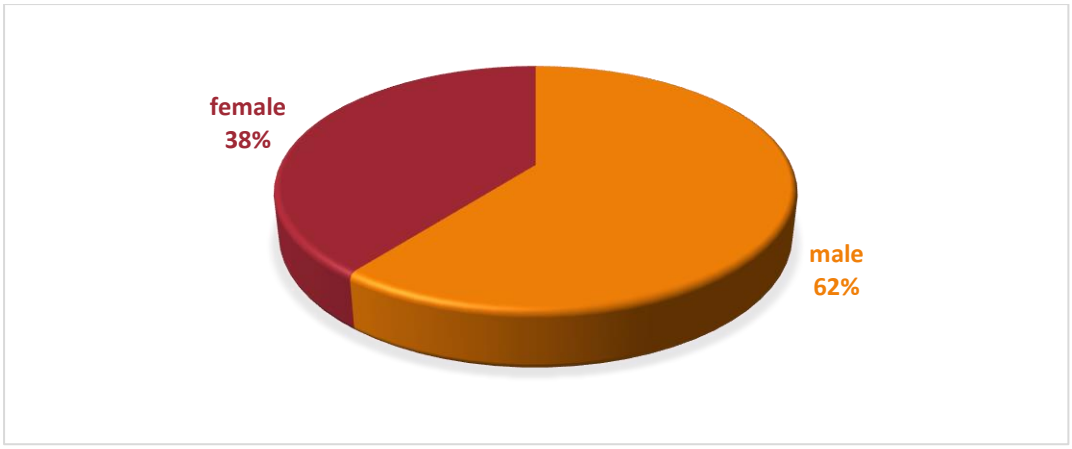


Figure 3.3. Gender distribution of the study population

3.4. Rhegmatogenous retinal detachment surgery

Ninety nine patients had PPV surgery for rhegmatogenous retinal detachment repair and the other 65 patients had PPV for diabetic retinal detachment. The mean age (± standard deviation) of these patients was 48 years (±18.4), median 53 years (range 4-75), 62% were male and 38% female.

3.4.1 Causes of rhegmatogenous retinal detachment

The most common cause of rhegmatogenous retinal detachment in this study was trauma, followed by cataract surgery, high myopia, posterior vitreous detachment (PVD) and previous CMV retinitis associated with retroviral disease (table 3.1).

Table 3.1 Causes of rhegmatogenous retinal detachment

Causes	**% (n)**
Trauma	37.4% (37)
Cataract surgery	21.2% (21)
High myopia	19.2% (19)
Posterior vitreous detachment (PVD)	9.1% (9)
Unknown	9.1% (9)
CMV retinitis	4% (4)

3.4.2 Duration of vision loss

The duration of vision loss in patients with rhegmatogenous detachments displayed a median of 8 weeks (range = 1 - 104).

3.4.3 Functional and anatomical outcomes

Eighty three eyes (84%) had a successful outcome (improvement or stabilization in vision plus anatomical reattachment).Forty eyes (40%) had visual acuity improvement, 43 eyes (43%) retained the same visual acuity and 16 eyes (16%) had vision loss. Successful anatomical reattachment was obtained in 92 eyes (93%) and 7 eyes (7%) remained detached after multiple surgical repairs (appendix A).

3.4.4 Factors associated with outcomes

Young patients had significantly better outcomes than relatively older patients with a p-value of 0.0089 (table 3.2).

Table 3.2. Age against success and failure (Student T-Test)

	Success	**Failure**	**p-value**
Age (±SD)	44 (±18.5) n= 83	57 (±13.68) n= 16	p=0.0089

Fifty eight percent (n=57) of eyes were complicated by PVR, and 42% had no PVR. Outcomes measured against PVR using the Fisher's exact test suggest that eyes with PVR had poorer outcomes than eyes without PVR, however and this was found to be insignificant with a p-value of 0.17(table 3.3).

Table 3.3 Outcomes against PVR

	Success	**Failure**	**Total**
PVR present	45	12	57
No PVR	38	4	42
Total	83	16	99 p=0.17

The primary causative hole was found superiorly/above the horizontal meridian in 33.3% (n=33) of the detachments, inferior holes in 22.2% (n=22) of the detachments, 19.2% (n=19) had multiple holes in different quadrants, 5.1% (n=5) had a dialysis, 3% (n=3) were macular holes, and in 16.2% (n=16) of cases the causative hole was not identified. There was no significance in outcomes between inferior and superior holes with a p-value of 0.24 (Fisher's Exact test), table 3.4.

Table 3.4 Outcomes against the position of the hole

	Success	**Failure**	**Total**
Superior holes	30	3	33
Inferior holes	17	5	22
Total	47	8	55 p-value 0.24

Most of the detachments, i.e. 64% (n=63) involved the macula and 36% were macular sparing detachments. Macular involving detachments had relatively poorer outcomes than macular sparing detachments, however was no statistical significance between the two groups (p-value 0.40 Fisher's Exact), table 3.5.

Table 3.5 Outcomes against pre-operative macular status.

	Success	**Failure**	**Total**
Macula off	51	12	63
Macula on	32	4	36
Total	83	16	99 p-value =0.40

3.5. Diabetic retinal detachment

In this study 65 patients had PPV surgery for diabetic retinal detachment. These patients either had a tractional or a combined tractional and rhegmatogenous retinal detachment. The group consisted of 63% (n=41) male patients and 37 % (n=24) female. The mean age (± standard deviation) of the group was 54 years (±12.20 years) and the median was 57 years with a range of 22-69 years. All of the patients were diabetic, 47 (72%) also had hypertension and 6 (9.2%) had associated renal failure. Sixty eight percent (n=44) had tractional retinal detachment and 32% (n=21) had a combined tractional and rhegmatogenous retinal detachment.

Seventy one percent (n=46) obtained a successful surgical outcome with either improvement or stabilization in vision and attachment of the retina.
Twenty four patients (36.9%) had vision improvement, another 22(33.9%) retained the same vision and 19 patients (29.2%) had deterioration in vision. Fifty five patients (84.6%) obtained anatomical attachment of the retina and 10 (15.4%) remained detached after repeat surgery (appendix B).

3.5.1 Vitreous haemorrhage in diabetic detachments

Vitreous haemorrhage complicated the detachments in 21(32.3%) patients; however the outcome was not significant when compared to detachments without associated vitreous haemorrhage (table 3.6).

Table 3.6 Outcomes against vitreous haemorrhage

	Success	**Failure**	**Total**
Associated vitreous haemorrhage	17	4	21
No vitreous haemorrhage	29	15	44
Total	46	19	65 p-value=0.26

3.5.2 Pre-operative macular status

The majority of patients i.e. 60% (n=39) had diabetic retinal detachment involving the macula, however the outcome measure of macular involving detachments compared to macular sparing diabetic detachments was not significant (table 3.7).

Table 3.7 Outcomes against the state of the macula pre-operatively (diabetics)

	Success	**Failure**	**Total**
Macula Off	28	11	39
Macula On	18	8	26
Total	46	19	65 p-value=1.0

3.5.3 Fibrovascular involvement

Sixty eight percent (n=44) of the diabetic detachments had extensive fibrosis (180º or more). There was no significance in outcomes between the group that had less than 180º of fibrosis and those that had more than 180º of fibrosis (table 3.8).

Table 3.8 Extent of fibrosis against outcomes

	Success	Failure	Total
≥180º fibrosis	30	14	44
<180º fibrosis	16	5	21
Total	46	19	65 p-value=0.57

CHAPTER 4 – DISCUSSION

In this clinical audit of retinal surgery for retinal detachments, the majority of patients had rhegmatogenous detachments and fewer had diabetic retinal detachments. These findings are in keeping with the accepted knowledge that rhegmatogenous detachment is the common type of retinal detachment.[1]

Racial profile of my study population represents the demographics in South Africa and Johannesburg in particular, with the majority of patients being African, followed by White, Mixed race and Indian.

4.1. Rhegmatogenous retinal detachment

The mean age of 48 years (median 53) at presentation in this study and the preponderance of males are comparable to the study by Nwosu *et al.* that was performed in a Nigerian eye hospital. The median age for their rhegmatogenous detachment patients was 56 years with more males than females (31 versus 21).[19] A study by Asaminew *et al.* from an Ethiopian hospital found the median age for patients with rhegmatogenous detachments to be 42 years.[20]

The well known risk factors for the development of rhegmatogenous detachments are myopia, cataract surgery, peripheral degenerations and trauma.[1,2,3,4,5,6] In their study from India, Pandey *et al.* found that cataract surgery was the most common cause of rhegmatogenous detachment followed by high myopia, trauma, and peripheral degeneration.[2] A study by Thelen *et al*. in a German hospital found that

62% of their detachments were secondary to cataract surgery and only 8.5% were trauma related.[4]

However, in Africa, the pattern of disease is different. In this study trauma was the most common cause of rhegmatogenous retinal detachment, accounting for 37% of cases, followed by cataract surgery, high myopia and PVD. Another South African study by Peters similarly found that trauma accounted for majority (29.8%) of the retinal detachments in her study. The prevalence of trauma-related retinal detachment in South Africa is higher than in countries outside of Africa, and correlates with the complex social challenges in Africa which include high unemployment rates, substance abuse, lack of education, and high rates of crime and violence. Nwosu et al. also found that trauma was the most common predisposing factor for retinal detachments in their Nigerian hospital.[19] Similarly, in the Ethiopian study by Asaminew et al. trauma was also found to be the most common risk factor, followed by myopia and posterior uveitis.[20]

Africa has high rates of HIV infection and other systemic infections. Posterior uveitis or retinitis (such as CMV retinitis) is not mentioned as a cause of rhegmatogenous detachment in non-African studies such as India, Asia or Germany. However, in the African studies infectious and inflammatory causes contribute to the development of retinal detachments. In this study 4% of patients who were immune-compromised had retinal detachments as sequelae of CMV retinitis with secondary atrophic holes in the retina. The Nigerian and Ethiopian studies also both found posterior uveitis as a common risk factor for the development of retinal detachments in their patients .[19, 20]

4.1.1 Outcomes (visual acuity and anatomical reattachment)

The duration of vision loss, PVR, the pre-operative macula status and visual acuity are important factors that influence the success of rhegmatogenous retinal detachment surgery.[2,3,4,5,6]

Surgical management improved or stabilized vision in 84% of patients in this study. This study results are comparable to those by Pandey et al. (India); in their study visual acuity improved in 43.3%, remained the same in 53.3% and worsened in 3.3%.[2] Nwosu et al. (Nigeria) found 88.9% of their patients improved or stabilized vision, however their surgical method was cryo-retinopexy and scleral buckling and not pars plana vitrectomy.[21] The authors commented that they would expect better outcomes if they had vitrectomy equipment to tackle more complex cases.[21]

In this study 93% of eyes had successful anatomical reattachment after three months post surgery. Nwosu et al. (Nigeria) reported 83.3% anatomical success at six months (including patients that had a second surgery).[21] The study by Thelen et al.(Germany) found that the overall reattachment rate of 4325 non-traumatic retinal detachment patients was 83.98%, however in trauma patients with detached maculae the reattachment rate was 73.49%.[4]

PVR is an important cause of unfavourable surgical outcomes for retinal detachment repair. In this study the presence of PVR was suggestive to be associated with poor anatomical and functional outcomes although not statistically significant. Pournaras et al and Nwosu et al found that PVR contributed to the surgical failure.[13, 21] Fifty seven percent of patients in this study presented with PVR, Peters found 33.3% of

PVR and there was 19.2% PVR in the Nigerian study, and 20% in the Indian study.[2,10,19] Ethiopia had the highest rate of grade C PVR (69.1%).[20] There is a significant difference in the PVR rate amongst the three African countries (South Africa, Nigeria, Ethiopia) and the reason for this is not clear.

Most of the rhegmatogenous retinal detachments were associated with superior retinal holes in this study and these seemed to have favourable outcomes compared to detachments associated with inferior retinal holes. Nwosu et al found 73.1% of the holes in the superior retina, Asaminew et al found 45.5% of the holes superiorly.

Macular involvement in rhegmatogenous retinal detachments is a known poor prognostic factor. The macula was detached in the majority of patients in this study. This trend has similarly been reported in studies from India, Nigeria and Ethiopia.[2,19,20]

4.2 Diabetic retinal detachment

All the patients in this group had either type 1 or type 2 diabetes with associated advanced proliferative diabetic retinopathy; and presented with either tractional detachments or combined tractional and rhegmatogenous detachments.

The mean age at the time of presentation amongst the diabetic detachment patients was 54 years, median 57. In their study on outcomes of tractional detachments in diabetic retinopathy, Qamar et al. found their patients presented in the fifth decade, with the mean age of 52(range 40-60 years).[15] Gupta et al. also had diabetic retinopathy patients with the mean age of 54.08 years (SD$\pm$14.15).[17]

4.2.1 Outcomes (functional and anatomical)

Various factors are known to cause poor surgical outcomes in late complications of proliferative diabetic retinopathy such as poor pre-operative visual acuity, macular detachment, complex fibro-vascular membranes and iris neovascularisation.[16] Diabetic patients may also have associated diabetic maculopathy with or without ischaemia which is a poor prognostic finding. Seventy one percent of our diabetic patients had stabilised or improved vision following surgery and 85% of the operated cases remained attached three months post-operatively.

The functional and anatomical outcomes in this study are promising and suggest that the results in this centre may be comparable with those found in other centres. Gupta et al. in their study in the United Kingdom, found a 93.2% stabilisation in vision and an 84.3% anatomical success.[17] Qamar et al. (Bahawal Victoria hospital, Pakistan) had a 75% improvement in vision and a 92.8% reattachment rate (including patients who required a second retinal procedure).[15] However, the sample size in the diabetic group in this study is too small to compare these results adequately against other studies.

Only 31% of the study population had prior laser treatment and this resulted in the majority of patients presenting with a fibrovascular complex of more than 180º. More extensive fibrovascular membranes correlate with poorer surgical outcomes. In this study extensive fibrovascular membrane of more than 180° was suggestive to be associated with poorer outcomes; however these findings were not statistically significant.

Macular ischaemia is another known major risk factor for poor outcomes.[23, 24, 25, 26] In this study the anatomical attachment is higher than the visual success, and this is most likely due to macular ischaemia.

Altan et al. reported various complications of pars plana vitrectomy in their study of diabetic tractional detachment, including retinal tear formation in 28.5%, re-detachment in 14.2% and hypotony in 21.4%.[23] In this study 15.4% of patients re-detached, however other complications were not noted in this study sample, a larger sample size would have likely identified more complications.

Barzideh et al. described the role of Optical Coherence Tomography (OCT) in measuring sub-foveal fluid post surgery, and they found that persistent sub-foveal fluid is the cause of poor or delayed visual recovery.[22] Unfortunately, OCT was not routinely done for our patients post-operatively, and therefore we cannot compare our results with those found by Barzideh. In the future, this is a measurement we should include in our post-operative visits because of the implications it has on visual recovery.

The outcomes of surgery for retinal detachment at Charlotte Maxeke Johannesburg academic hospital are comparable to those found in other studies, within the limitations of the study.

4.3 Limitations of the study

The study was done retrospectively looking at the clinical records of patients who had retinal surgery from 2010 to 2014. The retrospective nature of the study is the major limiting factor as a very large proportion of the potential study population was excluded purely based on missing and/or incomplete records. This impacted on the sample size which in turn may have influenced the outcome as well as the relative significance of variables that may or may not have influenced the outcome in these eyes.

With more than 50% of the hospital records for this period either missing or incomplete, I cannot generalise the results of my study to the entire retinal detachment patient population at Charlotte Maxeke Johannesburg academic hospital during the study period. This makes the interpretation of the study findings very difficult and any conclusions need to be viewed in the light of this major limitation.

CHAPTER 5 - CONCLUSION

This study, not withstanding its major limitation of not finding the majority of patients' records, demonstrates that the surgical intervention for rhegmatogenous and tractional retinal detachments in this Johannesburg hospital is mostly successful in terms of stabilization or improvement of vision and anatomical attachment of the retina. The results of my sample of patients are comparable with those found in other African countries and other developed countries. The differences in aetiology and presentation of retinal detachments in African countries and in more developed areas could be attributed to both socio-economic and inherent genetic factors in Africa.

The discrepancy between anatomical and functional outcomes is caused by death of the photoreceptors. This occurs in rhegmatogenous retinal detachments involving the macula that have a delay in treatment and when there is ischaemia in diabetic retinal detachments. Better awareness, screening and referral systems are required in order to diagnose and treat patients early before they reach advanced disease stages.

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APPENDIX A

Visual and Anatomical outcomes of rhegmatogenous retinal detachment

Subject number	Pre-operative Visual acuity	Post-operative Visual acuity	Vision status	Retina
1	CF	CF	same	flat
2	CF	CF	same	flat
3	CF	6/9	improved	flat
4	CF	HM	lost	detached
5	HM	HM	same	flat
6	HM	HM	same	flat
7	LP	CF	improved	flat
8	HM	HM	same	flat
9	CF	CF	same	flat
10	HM	CF	improved	flat
11	CF	6/24	improved	flat
12	CF	6/60	improved	flat
13	CF	6/36	improved	flat
14	CF	6/60	improved	flat
15	HM	6/60	improved	flat
16	HM	CF	improved	flat
17	CF	NLP	lost	detached
18	LP	6/36	improved	flat
19	HM	6/24	improved	flat
20	6/18	6/18	same	flat
21	CF	6/9	improved	flat
22	CF	NLP	lost	detached
23	HM	HM	same	flat
24	CF	CF	same	flat
25	CF	6/12	improved	flat
26	CF	6/24	improved	flat
27	CF	HM	lost	detached
28	CF	CF	same	flat
29	LP	HM	improved	flat
30	CF	CF	same	flat
31	6/60	6/60	same	flat
32	LP	LP	same	flat
33	6/60	CF	lost	flat
34	LP	LP	same	flat
35	HM	HM	same	flat
36	HM	HM	same	flat
37	CF	HM	lost	flat

38	CF	CF	same	flat
39	CF	CF	same	flat
40	CF	CF	same	flat
41	CF	HM	lost	flat
42	CF	NLP	lost	detached
43	LP	CF	improved	flat
44	CF	CF	same	flat
45	HM	6/60	improved	flat
46	HM	CF	improved	flat
47	6/18	6/18	same	flat
48	CF	6/60	improved	flat
49	HM	HM	same	flat
50	CF	CF	same	flat
51	CF	CF	same	flat
52	CF	CF	same	flat
53	CF	CF	same	flat
54	CF	6/60	improved	flat
55	6/60	CF	lost	flat
56	CF	CF	same	flat
57	CF	CF	same	flat
58	LP	CF	improved	flat
59	HM	6/24	improved	flat
60	CF	CF	same	flat
61	CF	CF	same	flat
62	HM	6/60	improved	flat
63	CF	6/24	improved	flat
64	6/36	6/60	lost	flat
65	6/60	CF	lost	flat
66	CF	6/36	improved	flat
67	6/18	6/18	same	flat
68	CF	6/60	improved	flat
69	HM	HM	same	flat
70	CF	CF	same	flat
71	CF	CF	same	flat
72	HM	CF	improved	flat
73	CF	CF	same	flat
74	CF	6/9	improved	flat
75	HM	HM	same	flat
76	HM	6/60	improved	flat
77	LP	CF	improved	flat
78	CF	CF	same	flat
79	HM	CF	improved	flat
80	CF	6/36	improved	flat

81	CF	6/60	improved	flat
82	CF	6/36	improved	flat
83	HM	6/60	improved	flat
84	LP	NLP	lost	detached
85	CF	6/12	improved	flat
86	CF	HM	lost	flat
87	CF	LP	lost	detached
88	CF	HM	lost	flat
89	6/36	6/36	same	flat
90	6/18	6/24	lost	flat
91	HM	CF	improved	flat
92	CF	CF	same	flat
93	CF	CF	same	flat
94	HM	HM	same	flat
95	CF	CF	same	flat
96	CF	6/12	improved	flat
97	CF	6/24	improved	flat
98	CF	CF	same	flat
99	LP	HM	improved	flat

APPENDIX B

Visual and Anatomical outcomes of diabetic retinal detachment

Subject Number	Pre-operative visual acuity	Post-operative visual acuity	Vision status	Retina
D1	CF	CF	same	flat
D2	6/24	6/24	same	flat
D3	CF	CF	same	flat
D4	6/60	6/36	improved	flat
D5	CF	CF	same	flat
D6	6/18	6/18	same	flat
D7	6/60	CF	lost	detached
D8	HM	LP	lost	detached
D9	HM	6/24	improved	flat
D10	CF	6/60	improved	flat
D11	HM	HM	same	flat
D12	CF	HM	lost	detached
D13	HM	HM	same	flat
D14	CF	CF	same	flat
D15	6/60	CF	lost	flat
D16	6/60	CF	lost	flat
D17	LP	CF	improved	flat
D18	CF	6/60	improved	flat
D19	CF	LP	lost	flat
D20	6/60	6/36	improved	Flat
D21	CF	CF	same	flat
D22	CF	6/60	improved	flat
D23	CF	6/60	improved	flat
D24	6/36	6/60	lost	flat
D25	CF	HM	lost	detached
D26	CF	NLP	lost	detached
D27	6/60	6/24	improved	flat
D28	CF	CF	same	flat
D29	CF	6/18	improved	flat
D30	CF	CF	same	flat
D31	CF	CF	same	flat
D32	HM	CF	improved	flat
D33	CF	HM	lost	flat
D34	6/24	6/24	same	flat
D35	CF	LP	lost	detached
D36	CF	CF	same	flat
D37	HM	6/24	improved	flat

D38	CF	6/18	improved	flat
D39	6/24	6/24	same	flat
D40	HM	NLP	lost	detached
D41	6/36	6/36	same	flat
D42	CF	CF	same	flat
D43	CF	CF	same	flat
D44	6/12	6/9	improved	flat
D45	6/18	6/18	same	flat
D46	CF	CF	same	flat
D47	HM	LP	lost	detached
D48	HM	6/24	improved	flat
D49	CF	6/60	improved	flat
D50	CF	HM	lost	flat
D51	CF	HM	lost	flat
D52	HM	CF	improved	flat
D53	CF	CF	same	flat
D54	6/60	CF	lost	flat
D55	6/60	CF	lost	flat
D56	LP	CF	improved	flat
D57	CF	6/60	improved	flat
D58	CF	6/60	improved	flat
D59	6/60	6/36	improved	flat
D60	CF	CF	same	flat
D61	CF	6/60	improved	flat
D62	CF	6/60	improved	flat
D63	6/36	6/18	improved	flat
D64	CF	HM	lost	detached
D65	CF	NLP	lost	detached