Reoperation Rates of Patients Undergoing Primary Noncomplex Retinal Detachment Surgery in a Cohort of the IRIS Registry

PRETHY RAO, RICHARD KAISER, FLORA LUM, ELIZABETH ATCHISON, DAVID W. PARKE II, AND GEORGE A. WILLIAMS

• PURPOSE: **To present the reoperation rates of patients who underwent a primary noncomplex RD repair in a cohort of the American Academy of Ophthalmology IRIS Registry.**

• DESIGN: **Retrospective, nonrandomized comparative clinical study.**

• METHODS: **This was a retrospective, nonrandomized cohort study of patients who underwent a primary noncomplex RD repair with either a scleral buckle (SB) or vitrectomy with or without scleral buckle (PPV±SB) between 2013 and 2016. The primary outcome was the odds of reoperation within 12 months.**

• RESULTS: **Of 24,068 patients, 2,937 patients (12.2%) underwent an SB and 21,131 patients (87.8%) a PPV ± SB. The overall reoperation rate was 12.2% for SB and 11.6% for PPV ± SB. After multivariate adjustment for age and initial RD diagnosis, the PPV ± SB group exhibited a lower odds of reoperation within 12 months compared with SB only (OR 0.84, 95% CI 0.75-0.96, $P = .007$). However, there was an age interaction. Patients ≤50 years old with PPV ± SB exhibited a higher odds of reoperation (OR 1.46, 95% CI 1.14-1.88, $P = .003$) compared to SB only. Patients >50 years with PPV ± SB had a lower odds of reoperation (OR 0.73, 95% CI 0.63-0.84, $P < .0001$).**

• CONCLUSION: **The odds of reoperation of PPV ± SB compared with SB only varies depending on the patient's age. Further subset analyses are required to determine if there are clinically relevant differences with respect to RD configuration or other RD repair types (PPV only vs PPV with SB). (Am J Ophthalmol 2021;222: 69–75. © 2020 Elsevier Inc. All rights reserved.)**

RHEGMATOGENOUS RETINAL DETACHMENTS (RDS) are one of the most common surgical diseases for the vitreoretinal specialist with an estimated incidence between 9.1 and 17.9 cases per 100,000 in the United States.[1] In light of rising US health care costs, the financial implications of this condition are a growing health policy concern.[2]

The evolution of vitreoretinal surgery has resulted in 3 main procedures for RDs based on the pathogenic principles of vitreoretinal traction and retinal tears: scleral buckling (SB), pars plana vitrectomy (PPV), and combined PPV and SB. Currently, there is no consensus on the optimal surgical approach for primary repair of noncomplex RDs. Numerous factors may play a role in clinical decision making, including age, lens status, RD configuration and/or duration, patient compliance, and surgeon preference. Although the retrospective and prospective literature comparing the surgical modalities is extensive, the larger-scale randomized trials,[3–8] meta-analyses,[9–12] and the most recent European Vitreoretinal Society Retinal Detachment (EVRS) series[13] have revealed mixed results.

The purpose of this study was to evaluate the reoperation rates of patients who underwent a primary noncomplex RD repair with either an SB or a PPV±SB in a cohort of the American Academy of Ophthalmology (AAO) IRIS Registry (Intelligent Research in Sight).

METHODS

THIS WAS A NONRANDOMIZED, RETROSPECTIVE, COMPARATIVE clinical study of patients who underwent a primary noncomplex retinal detachment repair with either an SB (Current Procedural Terminology [CPT] code 67107) or PPV with or without an SB (CPT code 67108). All patients had at least 12 months of postoperative follow-up after the initial repair. The recruitment or enrollment period for patients to have undergone a primary noncomplex RD repair was between January 1, 2013, and June 30, 2016. The total study and follow-up period ranged from January 1, 2013, to June 30, 2017, in order to encompass all of the 12 months of postoperative follow-up. Primary noncomplex retinal detachment repair was defined as the first RD surgery with either an SB or PPV±SB (CPT code 67107 or 67108) in the absence of proliferative vitreoretinopathy or giant retinal tear at the time of the first surgery.

Accepted for publication Aug 13, 2020.

From the Emory Eye Center (P.R.), Atlanta, Georgia, Mid Atlantic Retina (R.K.), Philadelphia, Pennsylvania, American Academy of Ophthalmology (F.L., D.W.P., G.A.W.), San Francisco, California, and Ophthalmology LTD (E.A.), Sioux Falls, South Dakota, USA, Associated Retinal Consultants, (G.A.W.) Royal Oak, Michigan.

Inquiries to Prethy Rao, 1365 Clifton Road Clinic Building B, Atlanta, GA 30322, USA; e-mail: prerao1@gmail.com

0002-9394/$36.00
https://doi.org/10.1016/j.ajo.2020.08.027

• **STUDY SAMPLE:** Individuals were part of AAO IRIS Registry, the first United States-based (US) national comprehensive eye disease database. The IRIS Registry's electronic health record (EHR) base consisted of approximately 1,790 ophthalmologist-based practices with 7,791 participating physicians as of June 30, 2016.

The study sample was constructed based on common procedural technology codes (CPT), international classification of disease (ICD)-9 and ICD-10 diagnostic codes from the IRIS Registry cohort (Supplementary Table S1). Aggregated data from the IRIS Registry are de-identified and do not require patient consent. The IRIS Registry started official recruitment in January 2013 for ophthalmologist-based practices. Once patients were enrolled, the IRIS Registry had the limited ability to extract diagnostic and procedure codes in an entire patient's EHR even prior to 2013 ("look back period"). Therefore, patients who underwent a primary noncomplex RD surgery any time during the 2013-2014 year, for example, had diagnostic codes that could be accessed prior to 2013, and were able to be screened for prior RD surgery or an RD diagnosis before final inclusion (as noted below). This was to ensure that the final IRIS cohort encompassed the most robust sample of "primary repairs."

Inclusion criteria included patients >18 years old who underwent a primary noncomplex retinal detachment repair (CPT code 67107 or 67018) between January 1, 2013, and June 30, 2016, and had at least 12 months of postoperative follow-up. One eye per patient was chosen to avoid the potential for inter-eye interactions and the influence of surgical decision making based on previous experience with the ipsilateral or contralateral eye. If an RD surgery occurred in both eyes sequentially during the study period, the first eye that underwent a surgical procedure was chosen for the study and followed throughout the study period. Exclusion criteria were the following: (1) patients with a history of RD repair (CPT code 67107, 67108, or 67113) or an RD diagnosis (single break, multiple breaks, total RD, retinal dialysis, giant retinal tear, or proliferative vitreoretinopathy) in the study eye within 1 year of the study period, (2) patients with an RD repair (CPT code 67107, 67108, or 67113) or an RD diagnosis in the contralateral eye within 1 year prior to the study period or any time during the study period, (3) proliferative vitreoretinopathy (ICD 9 361.81, ICD 10 H33.4 (1,2)) or giant retinal tear (ICD 9 361.03, ICD 10 H33.03) in the study eye at the time of initial repair, or (4) patients with CPT code 67107, 67108, or 67113 for which the IRIS Registry could not specify laterality.

• **COVARIATES:** Baseline demographics were obtained, including age, gender, and race. Concurrent ocular comorbidities collected in the study eye at the time of the first surgery were lens status and RD diagnosis (single break, multiple breaks, total retinal detachment, or retinal dialysis). The baseline demographics (age, gender, race) were chosen based on IRIS Registry availability and the ocular comorbidities (lens status, RD diagnosis) was chosen as these have the potential to influence the type of surgery chosen in clinical practice. Posterior vitreous detachment at time of surgery was also considered initially but not ultimately included as the final diagnostic coding for this variable was inconsistent.

Retinal detachment repair was divided into 2 comparison groups by CPT code: SB (CPT 67107) and PPV±SB (CPT 67108).

• **REOPERATION RATE:** The *primary outcome*, reoperation risk, was defined as the presence of a second RD repair (CPT code 67107, 67108, or 67113) that was billed within 3, 6, or 12 months after the first procedure (67017 or 67108). The *secondary outcome* was the odds of reoperation within 12 months of PPV±SB compared to SB only.

• **STATISTICAL ANALYSIS:** Baseline demographics and ocular comorbidities were compared between the RD repair types. Two-tailed *t* tests for continuous variables and χ^2 tests for categorical variables were used to assess significance. The level of significance for outcomes was set at $P < .05$.

• **IDENTIFICATION OF CONFOUNDING VARIABLES AND MODEL BUILDING: AGE-ADJUSTED AND MULTIVARIATE LOGISTIC REGRESSION MODEL:** An age-adjusted logistic regression model between baseline characteristics and reoperation risk and a second age-adjusted logistic regression between baseline characteristics and type of RD repair (ie, 67107 vs 67018) were first used to assess for potential confounders. Variables significantly related to both the type of RD repair and reoperation at 12 months in the age-adjusted logistic regression ($P < .10$) were chosen as the final selected confounders.

Next, a forward stepwise multivariate logistic regression model was constructed with reoperation as the outcome variable and RD surgery type (67107 or 67108) as the main cause or dependent variable. The final confounders were added in the order of the strongest to weakest *P* values. *P* for interaction ($P < .10$) among confounders was also calculated during the forward stepwise process to determine inclusion in the final model.

The possibility of an age interaction in the relationship between reoperation rates and RD repair type was also specifically explored during the forward stepwise model building process based on the clinical observation that age may influence choice of RD repair. Since an age interaction was present ($P < .10$), odds ratios were computed separately in the 2 age strata (≤50 vs >50 years). All data were analyzed using Stata software, version 13.1 (College Station, TX) and SAS, version 9.4 (SAS Institute, Cary, NC).

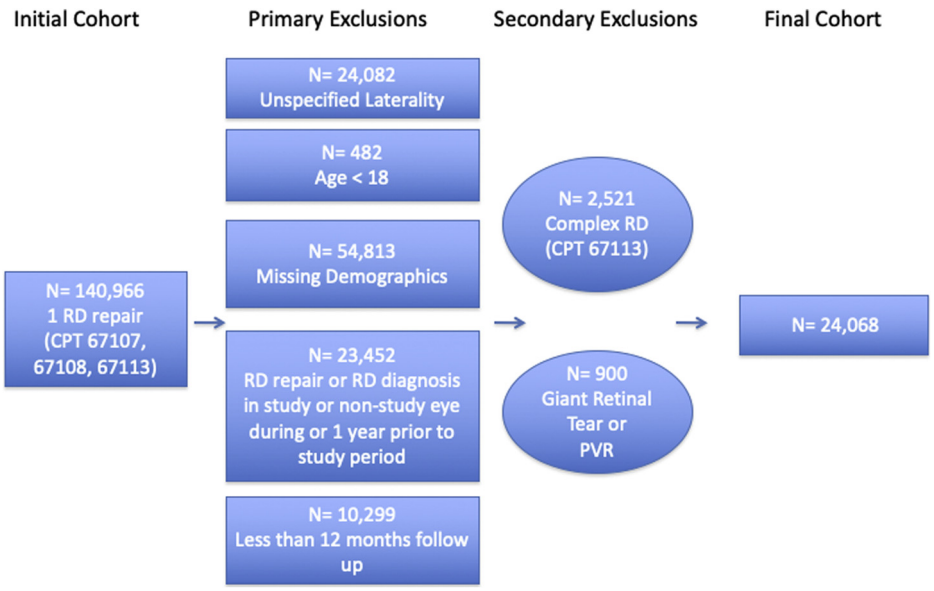

FIGURE. Exclusion criteria in a cohort of IRIS Registry patients undergoing primary noncomplex repair.

RESULTS

• **SAMPLE SIZE:** At the time of initial sample construction, IRIS Registry data was available until June 30, 2017. Because of our inclusion criteria requiring patients to be followed for 12 months postoperatively, the recruitment period was from January 1, 2013, to June 30, 2016, for patients to undergo the first noncomplex RD repair. The total study period ranged from January 1, 2013, to June 30, 2017.

A total of 140,966 patients underwent at least 1 RD repair (CPT code 67107, 67108, 67113) between January 1, 2013, and June 30, 2017. Patients were further excluded based on the following characteristics: (1) unspecified laterality (n = 24,082), (2) age <18 years and unavailable baseline characteristics (n = 55,295), (3) those who underwent prior RD repair or had an RD diagnosis in the study eye within 1 year of the study period or in the nonstudy eye during or 1 year prior to the study period (n = 23,452), and (4) patients with less than 12 months of postoperative follow-up (n = 10,299) (Figure).

After initial exclusions, a total of 27,489 unique patients underwent at least 1 RD repair (CPT code 67107, 67108, or 67113) between January 2013 and June 2016 with 12 months of postoperative follow-up. The overall reoperation rate was 12.1% by 12 months before further exclusions (data not shown).

For the final analysis of primary noncomplex RD surgery, patients were further excluded if the initial RD surgery was coded as complex (CPT code 67113; n = 2,521) or the initial diagnosis was proliferative vitreoretinopathy or giant retinal tear at the time of the first repair (n = 900) (Figure).

• **PARTICIPANT CHARACTERISTICS FOR NONCOMPLEX RD REPAIR:** Baseline characteristics are listed in Table 1. A total of 24,068 patients were ultimately included; 2,937 patients (12.2%) received an SB only and 21,131 patients (87.8%) underwent a PPV±SB at the time of first surgery. Average age was 61.6 years (range 18-100 years). Sixty-five percent of patients were phakic at the time of first surgery.

There were statistically significant differences between the 2 RD repair subgroups with respect to all baseline characteristics. Specifically, patients undergoing a primary SB were younger (52.1 years vs 62.9 years; $P < .0001$), more likely to be female (41.9% vs 37.2%; $P < .0001$), less likely to be white (69.0% vs 71.8%; $P < .0001$), and more likely to be phakic (87.6% vs 61.9%; $P < .0001$) compared with those who underwent a primary PPV±SB. With respect to baseline diagnoses, a greater percentage of patients with either single or multiple retinal breaks were significantly more likely to undergo a primary PPV±SB compared with an SB only (18.7% vs 13.3% and 16.4% vs 15.1%, respectively; $P < .0001$) (Table 1).

• **OVERALL REOPERATION RATE AND AGE-ADJUSTED MODEL:** Reoperation rates at 3, 6, and 12 months postoperatively are listed in Table 2. The overall reoperation rate of primary noncomplex RD surgery was 11.7% within 12 months postoperatively irrespective of RD surgery method. There was no overall significant difference in the unadjusted rates of reoperation between the SB and PPV±SB within 12 months irrespective of age (12.2% vs 11.6%; $P = .32$). Three-month reoperation rates and multivariate models closely aligned with the 12-month results (data not shown).

TABLE 1. Baseline Characteristics of Patients With Noncomplex Retinal Detachments Requiring Surgery Between 2013-2016 in a Cohort the IRIS Registry

Variable Name	Total	Scleral Buckle (CPT Code 67107)	PPV±SB[a] (CPT Code 67108)	*P* Value
Participants, n (%)	24,068	2,937 (12.2)	21,131 (87.8)	
Age at diagnosis, y, mean (range)	61.6 (18-100)	52.1 (18-99)	62.9 (18-100)	<.0001
Gender, n (%)				<.0001
Male	14,954 (62.1)	1,705 (58.0)	13,249 (62.7)	
Female	9,100 (37.8)	1,230 (41.9)	7,870 (37.2)	
Unknown	14 (0.1)	2 (0.1)	12 (0.1)	
Race, n (%)				<.0001
American Indian	114 (0.4)	21 (0.7)	93 (0.4)	
Asian	343 (1.4)	58 (2.0)	285 (1.3)	
Bi-/Multiracial	16 (0.07)	2 (0.07)	14 (0.7)	
Black	728 (3.0)	129 (4.4)	599 (2.8)	
Native Hawaiian	13 (0.05)	0 (0)	13 (0.06)	
Unknown	5,657 (23.5)	700 (23.8)	4,957 (23.4)	
White	17,197 (71.4)	2,027 (69.0)	15,170 (71.8)	
Ocular comorbidities, n (%)				
Lens status, n (%)				<.0001
Phakic	15,650 (65.0)	2,572 (87.6)	13,078 (61.9)	
Pseudophakic	8,418 (35.0)	365 (12.4)	8,053 (38.1)	
Diagnosis at time of first surgery, n (%)				<.0001
Unknown or unspecified	12,977 (53.9)	1,716 (58.4)	11,261 (53.3)	
Single break	4,354 (18.1)	392 (13.3)	3,962 (18.7)	
Multiple breaks	3,915 (16.3)	443 (15.1)	3,472 (16.4)	
Total retinal detachment	2,734 (11.4)	347 (11.8)	2,387 (11.3)	
Retinal dialysis	88 (0.4)	39 (1.3)	49 (0.2)	

[a]Pars plana vitrectomy with or without scleral buckle.

TABLE 2. Overall Reoperation Rates in Patients With Noncomplex Retinal Detachments Undergoing Primary Repair Between 2013-2016 in a Cohort of the IRIS Registry

First Operation	Scleral Buckle	PPV± SB[a]	*P* Value (χ^2)
Total no. of primary operations, n	2,937	21,131	
Total reoperation rate at 3 mo, n (%)	333 (11.3)	2,167 (10.2)	.071
Total reoperation rate at 6 mo, n (%)	351 (12.0)	2,355 (11.1)	.20
Total reoperation rate at 12 mo, n (%)	361 (12.2)	2,461 (11.6)	.32

[a]Pars plana vitrectomy with or without scleral buckle.

Model assumptions were met. In the age-adjusted logistic regression model, the PPV±SB group exhibited a lower odds of reoperation within 12 months compared to SB only (OR 0.84, 95% CI 0.75 - 0.96, $P = .007$). However, there was a significant age interaction between type of RD repair and risk of reoperation ($P = .005$). Upon further exploration by 10-year age increments, the odds of reoperation were statistically different in those ≤50 years vs >50 years old. Therefore, the final multivariate model using the initial qualified confounders was computed separately for each age strata (≤50 and >50 years) to account for the age interaction.

• **FINAL MULTIVARIATE MODEL:** Age (as a continuous variable) and RD diagnosis at time of initial surgery were identified as the final selected confounders ($P < .10$) and ultimately included in all of the final multivariate analyses. Baseline lens status did not qualify as a confounder and did not significantly affect the model after further exploratory adjustment (data not shown).

TABLE 3. Multivariate Logistic Regression Model[a] Between Type of Primary Noncomplex Retinal Detachment Repair and Odds of Reoperation Within 12 Months

	Total Reoperation, n (%)	Multivariate Odds Ratio (Confidence Interval)[b]	*P* for Trend
All ages (n = 24,068)	2,822 (11.7)	0.84 (0.75-0.96)	.007
≤50 y old (n = 3,770)	394 (10.4)	1.46 (1.14-1.88)	.003
>50 y old (n = 20,298)	2,428 (12.0)	0.73 (0.63-0.84)	<.0001
≤50 y old, phakic (n = 3,218)	332 (10.3)	1.46 (1.14-1.92)	.004
≤50 y old, pseudophakic (n = 552)	62 (11.2)	0.95 (0.35-2.57)	.923
>50 y old, phakic (n = 12,432)	1,427 (11.5)	0.82 (0.70-0.97)	.02
>50 y old, pseudophakic (n = 7,866)	961 (12.2)	0.49 (0.37-0.65)	<.0001

[a]Adjusted for age (continuous), retinal detachment diagnosis at the time of first surgery.

[b]Odds ratio of reoperation if patient received pars plana vitrectomy ± scleral buckle compared to scleral buckle only at the time of first surgery.

Of note, we initially controlled for differences in baseline characteristics between the groups (age as a continuous variable, race, lens status) as additional confounders in the final multivariate model. However, there was no significant difference in the final multivariate models with or without race and lens status. Therefore, these variables were not included in the final multivariate model to create the most conservative model.

In those ≤50 years old, the odds of reoperation within 12 months was 46% higher in the PPV±SB compared to those who underwent SB only for initial repair (OR 1.46, 95% CI 1.14-1.88, $P = .003$). However, in those >50 years old, the odds of reoperation were 27% lower in those who underwent PPV±SB compared to SB only (OR 0.73, 95% CI 0.63-0.84, $P < .0001$; Table 3).

With respect to baseline diagnosis, in those >50 years old, patients with multiple retinal breaks exhibited a higher odds of reoperation within 12 months compared to single retinal breaks regardless of RD repair type (OR 1.23, 95% CI 1.07-1.42, $P = .005$). However, there were no significant differences between the initial diagnosis and the odds of reoperation within 12 months among those ≤50 years old (data not shown).

• **LENS STATUS:** Lens status was not identified as a confounder in the overall multivariate analysis based on our initial confounder definition. However, given the importance of lens status on clinical decision making in practice and the significant age interaction, we performed an exploratory analysis to assess the impact of lens status on reoperation rates based on age. In those ≤50 years old and phakic, patients with a primary PPV±SB exhibited a higher odds of reoperation within 12 months compared with SB alone (OR 1.46, 95% CI 1.14-1.92, $P = .004$). In those ≤50 years old and pseudophakic, there was no difference in the odds of reoperation between SB or PPV±SB (OR 0.95, 95% CI 0.35-2.57, $P = .923$). In the >50-year age group, however, there was a statistically significant lower odds of reoperation within 12 months in those that underwent a primary PPV±SB compared with SB only in both the phakic (OR 0.82, 95% CI 0.70-0.97, $P = .02$) and pseudophakic groups (OR 0.49, 95% CI 0.37-0.65, $P < .0001$) (Table 3).

DISCUSSION

WE PRESENT THE OUTCOMES OF PATIENTS WHO UNDERwent a primary noncomplex RD repair and followed for 12 months postoperatively in a cohort of the AAO IRIS Registry. As of this writing, this is the largest nonrandomized comparative review that evaluates the reoperation rates and compares primary SB to PPV±SB in US clinical practice. Overall, the reoperation rate was 12.2% for SB only and 11.6% for PPV±SB within 12 months, respectively.

When comparing SB and PPV±SB after multivariate adjustment, we observed an overall lower odds of reoperation in those who underwent a PPV±SB compared to SB only. However, this risk of reoperation varied with age. There was a higher odds of reoperation for primary PPV±SB compared to SB only in those ≤50 years old. In contrast, there was a lower risk of reoperation for primary PPV±SB compared with SB only in those >50 years old.

In this US cohort, 87.8% of patients received a primary PPV with or without SB. This tendency toward vitrectomy is consistent with current trends nationally and worldwide. Eibenberger and colleagues reported a decline in scleral buckling from 40.5% to 2.7% from 2009 to 2014 with a corresponding rise in PPV from 38% to 90% in 2014.[14] A Medicare Part B claims evaluation in 2009 also noted that more than 70% of retinal detachment procedures were treated with a vitrectomy regardless of region.[15]

Although PPV appear to dominate vitreoretinal surgery trends, a review of current Level I and II literature (systematic reviews, randomized controlled trials, and/or meta-analyses) reveals mixed results with respect to reoperation

and type of RD repair.[3–13] Of the comparable large-scale retrospective reviews, these results do not completely align with EVRS in which SB exhibited a higher reoperation rate or second procedure (ie, Level 3 failure: recurrent detachment or complication requiring additional surgery) compared to PPV±SB regardless of lens status.[13] However, the definition of failure differed from this current study.

One reason for the mixed results in the literature may be age. We observed a difference in risk starting at age 50 years, which may be a chance finding. However, the complex interaction between age, lens status, and vitreous anatomy may be potential reasons for these results. With respect to risk, the >50 age group is the start of visually significant cataracts that require surgery, which may indirectly influence clinical decision making preoperatively and intraoperatively via selection bias.[16] The differential age effects also may be explained anatomically: younger patients have a more formed vitreous with stronger vitreoretinal adhesions that make inducing a true posterior vitreous detachment difficult during PPVs compared with older patients.[17,18]

Lens status at the time of surgery, depending on the individual's age, may also play a role in RD success rates. In this study, lens status did not qualify as an initial confounder and did not influence the overall multivariate model after further adjustment (data not shown). However, an exploratory subset analysis based on the age interaction demonstrated significant differences. Although there was no difference in reoperation risk in the ≤50-year pseudophakic group, there was a higher reoperation risk for PPV±SB in the ≤50-year-old phakic patients. These results are consistent with EVRS conclusions when level 1 failure criteria were used (true failure deemed inoperable).[13] In contrast, in the >50-year-old cohort, lens status did not influence the outcomes when comparing PPV±SB to SB only. In other words, in those >50 years old, both the pseudophakic and phakic patients significantly exhibited a lower odds of reoperation in the PPV±SB compared with SB-only group. This result is similar to the overall EVRS single surgery attachment.[13] However, care must be taken to not overanalyze this subset as this was an exploratory analysis beyond the scope of this article and there may be unknown biases.

There are several limitations of this study. First, we were unable to differentiate between PPV only and PPV with SB due to the limitations of CPT coding. Although we were able to categorize detachments into single breaks, multiple breaks, or total retinal detachments based on ICD 9 and 10 codes, the details of each RD, including the number, location, and extent of breaks, were also not available. Additionally, 50% of patients could not be categorized into the specific noncomplex RD subtypes. The exact reasoning is unknown, but may be a function of the limitations of data extraction. One possibility may also be a coding discrepancy pre- and postoperatively. For example, a patient may have been diagnosed with a retinal tear or vitreous hemorrhage preoperatively but was noted to have a local retinal detachment intraoperatively. It is also possible that a small subset of patients underwent these procedures prophylactically or for other diagnoses. However, this seems less likely as surgery for indications other than a retinal detachment have separate CPT codes that are relatively specific, such as PPV + focal laser photocoagulation or PPV + panretinal laser photocoagulation. We included these patients to provide the reader with those most complete cohort as possible.

Second, the strict requirements for this study limited the size of the patient cohort, including one eye per patient and no previous RD repair in the study or contralateral eye. Although these strict parameters allowed for a more homogeneous sample and reduced the number of confounding variables, these parameters and inclusions/exclusions were also a source of selection bias. Specifically, a large proportion of the initial sample was also excluded because of incomplete demographics and lack of specified laterality. Although the 12-month postoperative follow-up for initial inclusion was based on the initial surgery date, all patients who were included had a postoperative follow-up within 12 months of surgery. Despite this, the combination of the selection bias and follow-up assumption in this study may still underestimate the true reoperation rate. Lastly, there are multiple ways to build multivariate models, and we used one method in choosing our confounders using strict statistical definitions. However, we did perform exploratory analyses to account for potential known clinical factors that may impact decision making, such as lens status. Although the IRIS Registry provides a large volume of patients, the database is still limited. Clinical trials may be needed to truly balance groups and account for unmeasured confounders that cannot be adequately controlled for in a large, nonrandomized cohort.

However, this report provides real-world results on a broader scale that aids in patient counseling and clinical decision making on arguably the most common surgical disease that a vitreoretinal surgeon faces in his or her practice. Irrespective of surgical procedure, the single surgery success rate for primary noncomplex RD surgery in a large representative US sample is better than 88%. The broader patient population allows for more generalizable results because of no restrictions based on insurance type or region.

In summary, we report the largest national cohort of patients undergoing primary noncomplex RD surgery from the AAO IRIS Registry. Overall, there is a lower odds of reoperation for PPV±SB compared to SB only after multivariate adjustment. However, we demonstrated that patients aged ≤50 years have a higher odds of reoperation with PPV±SB compared to SB only, whereas those aged >50 years have a lower odds of reoperation with PPV±SB compared with SB only. Further subset analyses are required to determine if there are clinically relevant differences with respect to RD configuration or other RD repair types (PPV only vs PPV with SB).

FUNDING/SUPPORT: THIS STUDY RECEIVED NO FUNDING. FINANCIAL DISCLOSURES: NO RELEVANT CONFLICTING relationships exist for any authors with exception of Prethy Rao (royalties from Vortex Surgical) unrelated to this manuscript. All authors attest that they meet the current ICMJE criteria for authorship.

REFERENCES

1. Mitry D, Charteris DG, Fleck BW, Campbell H, Singh J. The epidemiology of rhegmatogenous retinal detachment: geographical variation and clinical associations. *Br J Ophthalmol* 2010;94(6):678–684.
2. Chang JS, Smiddy WE. Cost-effectiveness of retinal detachment repair. *Ophthalmology* 2014;121(4):946–951.
3. Heimann H, Bartz-Schmidt KU, Bornfeld N, Weiss C, Hilgers RD, Foerster MH. Scleral Buckling versus Primary Vitrectomy in Rhegmatogenous Retinal Detachment Study Group. Scleral buckling versus primary vitrectomy in rhegmatogenous retinal detachment: a prospective randomized multicenter clinical study. *Ophthalmology* 2007;114(12):2142–2154.
4. Ahmadieh H, Moradian S, Fanghihi H, et al. Pseudophakic and Phakic Retinal detachments (PARD) Study Group, Pseudophakic and Aphakic Retinal Detachment Study Group. Anatomic and visual outcomes of scleral buckling versus primary vitrectomy in pseudophakic and aphakic retinal detachment: six-month follow-up results of a single operation—report no. 1. *Ophthalmology* 2005;112(8):1421–1429.
5. Walter P, Hellmich M, Baumgarten S, et al; VIPER Study Group. Vitrectomy with and without encircling band for pseudophakic retinal detachment: VIPER Study Report No 2-main results. *Br J Ophthalmol* 2017;101(6):712–718.
6. Brazitikos PD, Androudi S, Christen WG, Stangos NT. Primary pars plana vitrectomy versus scleral buckle surgery for the treatment of pseudophakic retinal detachment: a randomized clinical trial. *Retina* 2005;25(8):957–964.
7. Moradian S, Ahmadieh H, Faghihi H, et al. Comparison of four surgical techniques for management of pseudophakic and aphakic retinal detachment: a multicenter clinical trial. *Graefes Arch Clin Exp Ophthalmol* 2016;254(9):1743–1751.
8. Sharma YR, Karunanithi S, Azard RV, et al. Functional and anatomic outcome of scleral buckling versus primary vitrectomy in pseudophakic retinal detachment. *Acta Ophthalmol Scand* 2005;83(3):293–297.
9. Soni C, Hainsworth DP, Almony A. Surgical management of rhegmatogenous retinal detachment: a meta-analysis of randomized controlled trials. *Ophthalmology* 2013;120(7):1440–1447.
10. Sun Q, Sun T, Xu Y, Wang BS, Nishimura T, Heimann H. Primary vitrectomy versus scleral buckling for the treatment of rhegmatogenous retinal detachment: a meta-analysis of randomized controlled clinical trials. *Curr Eye Res* 2012;37(6):492–499.
11. Arya AV, Emerson JW, Engelbert M, Hagedorn CL, Adelman RA. Surgical management of pseudophakic retinal detachments: a meta-analysis. *Ophthalmology* 2006;113(10):1724–1733.
12. Totsuka K, Inui H, Roggia MF, Hirasawa K, Noda Y, Ueta T. Supplemental scleral buckle in vitrectomy for the repair of rhegmatogenous retinal detachment: a systemic review of literature and meta-analysis. *Retina* 2015;35(11):2423–2431.
13. Adelman RA, Parnes AJ, Ducournau D. European Vitreo-Retinal Society (EVRS) Retinal Detachment Study Group. Strategy for the management of uncomplicated retinal detachments: the European vitreo-retinal society retinal detachment study report 1. *Ophthalmology* 2013;120(9):1804–1808.
14. Eibenberger K, Georgopoulos M, Rezar-Dreindl S, Schmidt-Erfurth U, Sacu S. Development of surgical management in primary rhegmatogenous retinal detachment treatment from 2009 to 2015. *Curr Eye Res* 2018;43(4):517–525.
15. Hwang JC. Regional practice patterns for retinal detachment repair in the United States. *Am J Ophthalmol* 2012;153(6):1125–1128.
16. Congdon N, Vingerling JR, Klein BE, et al. Eye Diseases Prevalence Research Group. Prevalence of cataract and pseudophakia/aphakia among adults in the United States. *Arch Ophthalmol* 2004;122(4):487–494.
17. Sebag J. Age-related differences in the human vitreoretinal interface. *Arch Ophthalmol* 1991;109(7):966–971.
18. Joshi MM, Ciaccia S, Trese MT, Capone A Jr. Posterior hyaloid contracture in pediatric vitreoretinopathies. *Retina* 2006;26(7 Suppl):S38–S41.