

National audit of the outcome of primary surgery for rhegmatogenous retinal detachment. I. Sample and methods

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Abstract

Purpose This national study was designed to audit anatomical outcome and complications relating to primary surgery for rhegmatogenous retinal detachments. This paper presents survey methods, characteristics of participating consultants and the demographic and clinical characteristics of the patient sample.

Methods Two surveys were undertaken. The first identified consultants who at the time performed retinal detachment surgery in the National Health Service. These surgeons formed the sampling frame for a nationwide cross-sectional clinical study that audited the outcomes of primary surgery for rhegmatogenous retinal detachments.

Consultants selected patients according to the study eligibility criteria and data were collected by self-administered postal questionnaires. A validation exercise was carried out to examine selection bias and reporting accuracy.

Results Only 256/671 (38%) of UK consultants, who responded to the first survey, indicated that they performed retinal detachment surgery on NHS patients. Annual activity varied between 0 and 400 primary procedures for rhegmatogenous retinal detachments. Seven hundred and sixty-eight eligible patients from 167 consultants were recruited for the clinical study. Twenty per cent of patients had a single retinal break with less than one quadrant of associated detachment and 45% had single or multiple breaks within the same quadrant and/or less than two quadrants of associated retinal detachment. Over 50% patients had single or multiple horseshoe tears. Validation studies suggested

that there was no significant bias from the selection of patients or inaccuracy in reporting outcomes.

Conclusions This large unselected group of primary rhegmatogenous retinal detachments provides a representative sample for considering variations in re-attachment rates. *Eye* (2002) 16, 766–770. doi:10.1038/sj.eye.6700324

Keywords: retinal detachment repair; audit; national survey

Introduction

Critical examination of clinical outcomes in the context of clinical governance has a high profile in medical practice and politics.^{1,2} When considering the production of clinical guidelines for the management of rhegmatogenous retinal detachments, the Royal College of Ophthalmologists identified that there was insufficient information on national practices and outcomes of surgery for retinal detachment repair in the United Kingdom (UK).

This study was therefore designed to audit the outcome of surgery for primary rhegmatogenous retinal detachment, including success and complication rates, and to provide baseline information on current practices of retinal detachment surgery from a nationally representative sample of patients.

This paper reports the study methods, characteristics of participating consultants and the demographic and clinical characteristics of the patient sample. The following paper reports clinical outcomes.³

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Methods

All UK consultant ophthalmologists were invited to participate in the study. A preliminary questionnaire, to identify and characterise consultants who undertook retinal detachment surgery on National Health Service (NHS) patients in the UK, was distributed in November 1997. Those who indicated that they currently performed retinal detachment surgery on NHS patients were subsequently invited to participate in a survey of clinical practice.

The clinical part of the study was a retrospective nation-wide cross-sectional survey. A cross-sectional design allowed small numbers of patients to be used from each surgeon, maximising response rate. Data were collected retrospectively to avoid inducing any change of practice that might result from knowledge of participating in the study. All clinical data were collected by a single questionnaire. Consultants were asked to review their operating theatre diaries and to select the most recent patients undergoing their first surgical procedure for rhegmatogenous retinal detachment before 1st October 1997. Consultants with a self-declared special interest in retinal surgery were asked to select their last six consecutive patients, and those consultants without a special interest, their last four consecutive patients. Patients with rhegmatogenous retinal detachments following penetrating eye injury, complicating a tractional retinal detachment or secondary to a macular hole and those who had previously undergone other posterior segment surgery were not eligible for inclusion in the study. The main clinical outcome measure was complete anatomical re-attachment at 3 months after the initial procedure and secondary outcome measures included complications relating to surgery. Complications were defined as any clinical event that had been reported in the clinical notes, either per-operatively, within 1 month (early) or between 1 and 3 months (late).

Audit standards were set for the outcomes of interest before the study commenced and were based on published evidence in conjunction with clinical experience.^{4–14} The minimum acceptable standards that the steering committee felt should be achieved are presented in Table 1.

In order to allow for case-mix a four-point grading system based on clinical features of the retinal detachment was devised by the steering committee (Table 2). One researcher (JAT), masked to surgeon and outcomes, graded all detachments.

Following piloting, data were collected using paper questionnaires. These were self-completed by participating surgeons. All data were kept in

Table 1 Standards set for the Retinal Detachment Audit

Anatomical reattachment	
–after 1 procedure	80%
–after >1 procedure	90%
Complications	
Per-operative	
–unplanned sub retinal fluid drainage	5%
–retinal incarceration	1%
Early (within 1 month)	
–endophthalmitis	0.1%
Late (1–3 months)	
–proliferative vitreoretinopathy	10%
–macular pucker	5%
–diplopia	5%

Table 2 Retinal detachment grading system

Grade	Description
1	A single retinal break with less than one quadrant of associated retinal detachment
2	Single or multiple breaks within the same quadrant and/or less than two quadrants of retinal detachment
3	Breaks confined to two quadrants and/or three or more quadrants of retinal detachment
4	Any complex break (including giant tears or extensive PVR) or a detachment not covered by the above grades

accordance with the Data Protection Act, with patients and consultants confidentiality maintained. Data were double entered and stored on a customised database and analysed using Stata Statistical Software: Release 5.0.

For the purposes of the analyses, a specialist was defined as a consultant with a self-declared special interest in retinal surgery and who also performed pars plana vitrectomy. The remaining consultants were defined as non-specialists. Multi-variate analysis was performed in order to identify predictors of successful anatomical outcome using the following variables; specialist status, grade of detachment, the presence of a high risk factor pre-operatively, type of surgery, break type and the timing of surgery from presentation. Associations between explanatory variables and outcome measures were measured using logistic regression, with statistical significance at $P < 0.05$. All analyses were adjusted for the cluster effect of sampling multiple patients from the same consultant.

A telephone survey of consultants who did not respond to the preliminary questionnaire was undertaken. Fifty per cent of the non-responders were randomly selected and up to four attempts were made to contact them by telephone to determine whether they operated on retinal detachments.

A validation study was undertaken to exclude significant bias in patient selection or the reporting of

results by consultants. After the clinical questionnaires had been received, hospitals that had participated were divided into two groups, those with at least one surgeon with a special interest in retinal surgery (50 hospitals) and those without (44 hospitals). Five hospitals were randomly selected from each group. All consultants were contacted individually and their permission sought to include their patients in the validation sample. The principle investigator (JAT) visited each unit. Before the visit, each unit was asked to identify an individual to provide the hospital records of patients included in the study and those of other patients undergoing retinal detachment procedures at the same time. This latter group was identified from the theatre diary using local clerical support and checked during the visit.

To assess the accuracy of data reporting, 13/43 (30%) data items from the original questionnaire were selected and during the visit the principle investigator reviewed the clinical notes and recorded the data items on a prepared proforma, masked to the information supplied by consultants in the original questionnaire. Reporting accuracy was assessed by comparing the number of discrepancies between the original questionnaires and the proformas completed during the validation visit. The accuracy of patient selection was assessed by examining the notes of excluded patients undergoing detachment surgery during the same time period as patients included in the study, identified from the operating theatre diaries.

Results

Preliminary questionnaire response rates

The response rate to the preliminary questionnaire was 93% (671/722). Of the respondents, 38% (256/671) indicated that they currently performed retinal detachment surgery, 35% (233/671) that they had once performed detachment surgery as a consultant but now had ceased and 24% (164/671) that they had never performed detachment surgery as a consultant.

Twenty-seven of the 51 non-responders to the preliminary questionnaire were randomly selected for a non-responder survey. No response was obtained from five and two consultants had retired. Of the remaining 20, 16 did not perform detachment surgery and four did. This suggested that detachment surgeons were not underrepresented in the responders to the preliminary questionnaire.

Profile of current detachment surgeons

One hundred and five consultants declared a special interest in retinal surgery. Of these 93 performed pars

plana vitrectomy and were defined as specialists for the analyses.

The number of surgical procedures to repair primary rhegmatogenous retinal detachments that surgeons performed annually, varied widely in both the specialist and non-specialist groups. The reported number of primary retinal detachments performed in 1996 by the consultants responding to the preliminary questionnaire varied between 2 and 400 (median = 70, mean = 90.6, 95% CI = 73.5–107.2, $n = 91$) for specialists and 0 and 50 (median = 5, mean 7.1, 95% CI = 5.9–8.2, $n = 150$) for non-specialists. From the reported activity by participating consultants and the response rates, the projected number of primary detachments performed annually in the UK was 10 276 (95% CI = 10094–10458).

Routine audit of the results of retinal detachment surgery was not universal. Only 70% (64/91) specialists and 46% (71/154) non-specialists routinely audited their surgical results.

The majority of surgeons had access to operating theatres to perform retinal detachment surgery outside normal working hours, but nearly 9% of specialists (8/91) and 7% of non-specialists (11/154) did not.

Clinical questionnaire response rates

Clinical questionnaires were sent in April 1998 to the 256 consultants who had been identified by the preliminary questionnaire. A response was obtained from 78% (200/256) consultants from this group. Eight consultants declined to participate in the study. Eighteen consultants had not operated on any patients in the year to 30th September 1997, although they had answered in the affirmative in the preliminary questionnaire. Clinical data were received from 167 consultants (72 specialists and 95 non-specialists) on 768 eligible patients. The adjusted response rate taking into account the consultants who indicated that they had no eligible patients was 70.4% (167/237).

Patient profile

The patients' ages ranged from 9 to 89 years (median 61). The right eye was involved in 50% (385/768) cases. Twenty percent (152/753, missing data = 15) of eyes had undergone previous cataract extraction, and the majority were pseudophakic (83%, 126/152). In 54% (409/757, missing data = 11) the macula was detached pre-operatively. The proportions of cases by type of break are given in Table 3, and by grade of detachment in Table 4.

Table 3 Frequency table of break types

<i>Break type</i>	<i>Frequency</i>	<i>Percentage</i>
Horseshoe tear(s)	403	52.5
Retinal hole(s)	206	26.8
Mixed holes and tears	62	8.1
Dialysis	66	8.6
Giant tears	5	0.6
No hole seen pre-operatively	26	3.4
Total	768	100

Table 4 Frequency table of grades of retinal detachment

<i>Grade</i>	<i>Frequency</i>	<i>Percentage</i>
1	158	20.6
2	352	45.8
3	158	20.6
4	96	12.5
Ungradeable	4	0.5
Total	768	100

Validation

The sample consisted of 20 consultants, 13 non-specialists and seven specialists. All consultants contacted consented to the inclusion of their patients in the validation study. As in one department it was not possible to retrieve notes, the validation sample represented 9.6% (74/768) of the study sample. The notes of 93.2% (70/74) of this group were examined. The remainder could not be found. Six out of 70 patients (8.6%) had been incorrectly included. Comparing the retinal outcome, 5/6 had the same outcome as the incorrectly excluded patient they had replaced. The maximum number of errors on any questionnaire was three out of 13 variables, noted in 11% of questionnaires examined. Of the remainder, 26% had no incorrectly reported variables, 40% had one incorrectly reported variable and 21% had two.

Discussion

The response rates of 93% to the preliminary questionnaire and 70% for the clinical questionnaire are in line with previous national audits.^{15–17} The non-response study showed that detachment surgeons were not underrepresented in the sample. The validation study established that there was no significant selection bias when patients were considered for inclusion by the participating clinician and that there was no significant inaccuracy when completing the clinical questionnaires.

The study design was necessarily retrospective to avoid inducing a change of practice by conducting the

study. A prospective audit would have had the advantage of specifying in advance what data were collected on each patient, and standardising the collection and assessment methods. Because of the reliance on the contemporaneous clinical notes, it was inevitable that for some patients data were incomplete.

Visual acuity was not included as a main outcome measure for two reasons. First the study was conducted over a short time period (visual function continues to improve for many months after detachment surgery¹⁸) and second, the retrospective nature of the study, preferred in order to avoid inducing a change of practice, meant that it was not possible to standardise the methods for measuring acuity pre- or post-operatively. In addition it would not have been possible to adjust consistently for co-existing ocular pathology (lens opacities or macular dysfunction) that would have a bearing on visual outcome. These methodological issues prevent robust evaluation of visual outcome by this study.

The calculated figures for annual detachments show that specialists perform the vast majority of detachment surgery. Though this figure is an estimate, based on operating levels for 1996, it suggests that the survey sampled over 8% of all detachments performed annually by the participating consultants. However the audit only sampled 5.2% of the workload of specialists while auditing 33.4% of the workload of non-specialists.

The reported levels of routine local or individual audit by clinicians of retinal detachment surgery outcome were disappointing. It is hoped that the publication of these national clinical outcomes will stimulate regular local audit by providing relevant benchmarks against which clinicians can judge their performance.

In conclusion, the findings of the national audit outcome of primary surgery for rhegmatogenous retinal detachment are based on a large representative sample of patients undergoing detachment surgery from a broad spectrum of UK consultant ophthalmologists.

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