Vicryl (polyglactin 910) in cataract surgery A controlled trial

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A preliminary study into the use of Vicryl in cataract and squint surgery has already been published (Munton, Phillips, Martin, Bartholomew, and Capperault, 1974). The safety and efficacy of the material were confirmed and it was concluded that the overall handling characteristics of monofilament Vicryl 8-0 (dyed purple) were superior to monofilament nylon and equal to virgin silk. The sutures were absorbed with minimal inflammatory reaction on average by the 58th post-operative day. The only abnormalities which were possibly attributable to the new suture were three drainage blebs in cataract sections, two of which disappeared spontaneously.

The purpose of this prospective, controlled randomized trial on the use of Vicryl in cataract surgery was to investigate further the possibility of a lack of wound security as a cause of draining blebs—an undesirable and occasionally dangerous complication—and to compare other early and late complications.

Material and methods

Vicryl (Ethicon) was supplied in lengths of 45–73 cm and diameter of 8-0 monofilament and was coloured violet, with one 6 mm curved spatulate needle at each end.

Patients with cataracts were taken without pre-selection from the waiting lists of the surgeons concerned and randomly (by coin tossing) allotted to the Vicryl or control groups. Unfortunately, numbers were limited by availability of suture material.

Surgeon A used an ab-externo incision and cryo-extraction and 4–5 interrupted 10-0 monofilament nylon or Vicryl sutures (18 eyes). Surgeon B used an ab-externo incision, chymotrypsin and forceps extraction, and 5–7 interrupted virgin silk or Vicryl sutures (22 eyes). Surgeon C used a Graefe section with one interrupted and one continuous suture, either Vicryl or monofilament nylon (five eyes).

There had been some difficulty in knot tying during the preliminary study. The initial double throw of Vicryl holds the suture at the required tension, the second (single) throw rucks up the first (double) throw, thereby tightening the knot further. Practice is required

to judge the correct tension needed on the first (double) throw if the final knot is not to be too tight. The third and final (single) throw then locks the knot.

Results

Details of the patients are shown in Table I and the complications in Table II.

Early complications, defined as shallow anterior chambers, draining blebs, choroidal detachment, and hyphaema, occurring during the first post-operative week—possibly attributable to the difficulty in knot tying and therefore to wound closure—were found in four out of 26 (15.4 per cent) of the Vicryl group while there were no complications in the control group of 19 patients. The difference, however, was not significant ($\chi^2 = 1.5$; $0.3 > P > 0.2$; $n = 1$).

Late complications, defined as draining blebs present and persisting two weeks after operation—possibly attributable to the new sutures—were found in five out of 26 (19.2 per cent) of the Vicryl group, compared with two out of 19 (10.5 per cent) in the control group—not a significantly different proportion ($\chi^2 = 0.07$; $P > 0.5$; $n = 1$).

Suture absorption occurred between 30 and 120 days (average 56 days) after operation. The operation on the patient in whom the sutures had disappeared by the 30th day had been complicated by rupture of the vitreous face and severe post-operative iritis. The draining blebs in the remaining patients closed spontaneously without further complication except for one in whom the bleb was freely draining nine months later.

Late hypertrophy in the wound areas was not seen during the 3- to 12-month postoperative period.

The χ^2 test with Yates's modification was used to determine the significance of difference between the Vicryl and control groups.

Discussion

This trial confirmed that the handling characteristics of 8-0 monofilament Vicryl are equal to or better than 10-0 monofilament nylon and equal to 8-0 virgin silk when used as an interrupted or continu-

Table I Results obtained by 3 surgeons in 45 cataract extractions

Surgeon	Vicryl				Control sutures			
	Operations	Suture	Comments	Follow-up	Operations	Suture	Comments	Follow-up
A	11	4-5 interrupted	1 hyphaema 2 shallow anterior chambers 1 draining bleb lasting 1/12	1 year	7	10-0 mono-filament nylon interrupted 4-5	1 small draining bleb for 1/12	1 year
B	11	5-7 interrupted	4 draining blebs lasting: 2 weeks 2 weeks 4 weeks 9 months 1 choroidal detachment	1 year	11	8-0 virgin silk 5-7 interrupted	1 draining bleb lasting 4 weeks	1 year
C	4	1 interrupted 1 continuous 10-13 loops	1 hyphaema 1 iritis	2-4 months	1	10-0 mono-filament nylon 1 interrupted continuous 10-13 loops	Nil	4 months

Table II Complications in 45 cataract extractions

Complication	Suture	
	Vicryl (n = 26)	Control (n = 19)
Draining blebs	5	2
Hyphaemas	2	—
Shallow anterior chamber	1	—
Choroidal detachment	1	—
Iritis	2	—
Early complications	4	—*
Late complications	5	2†

*Difference: $\chi^2 = 1.5$; $0.3 > P > 0.2$ †Difference: $\chi^2 = 0.07$; $P > 0.5$

ous suture. Knot tying, even with the modified technique described, is not so satisfactory as with 8-0 virgin silk.

The early complications of wound closure might be attributable to this difficulty in knot tying, the incidence being higher in the Vicryl (15.4 per cent) than in the control group (0 per cent). However, these differences were not significant ($\chi^2 = 1.5$; $P > 0.2$). More experience might well eliminate the problem. A very much larger sample would be

required to settle the question statistically. Even had this been practicable in our trial the supply of Vicryl became temporarily suspended.

Late complications—draining blebs present two weeks after operation—may be attributable to inadequate wound closure, as described above, but may also be due to too early suture dissolution. Small draining blebs are not uncommon after cataract surgery, if looked for, but seldom persist for more than four to six weeks. A permanent bleb must be considered an undesirable complication, possibly associated with increased astigmatism and certainly associated with the potential dangers of hypotony and intraocular infections (except in cases of glaucoma complicated by cataract, in which these risks are justifiably taken).

When experimentally implanted into rat muscle Vicryl is absorbed by hydrolysis in about 80 days, while tensile strength, although retained for 30 days, tends to be zero at this time (Capperault, 1971, 1973). Polyglycolic acid sutures are thought to be retained for a long time in human subcutaneous tissue (Watts, 1975). In the eye, sutures can be seen beneath the conjunctiva, and they had disappeared on average by the 56th postoperative day in our cases. In one patient they had entirely disappeared by the 30th day, and this was of particular interest because it showed that quicker hydrolysis may occur in an actively red eye with

greater than normal inflammatory reaction, higher temperature, and blood flow.

Disappearance of sutures from the corneo-scleral wound at this relatively early stage is not ideal in a situation where a corneal wound (in rabbits) has regained only some 30 per cent of the intact corneal strength (Condon and Hill, 1973). No information on limbal wounds is available. Despite these considerations, however, we did not find a significantly higher incidence of late complications. Early suture absorption does not thus appear to be an important factor in this series.

We inspected the corneo-scleral wounds 3 to 12 months postoperatively in view of the observation that intracuticular polyglycolic acid sutures cause late hypertrophy after three months in 50 per cent of skin wounds (Cox and Simpson, 1975). We saw no hypertrophy, however, which agrees with experimental observations on Vicryl (Capperauld, 1973).

References

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Summary

In a controlled, randomized trial in 45 cataract operations a new synthetic absorbable suture (8-0 monofilament Vicryl, made by Ethicon), was compared with monofilament nylon or virgin silk normally used. There was a higher incidence of early complications—hyphaema, shallow anterior chamber, and choroidal detachment (15.4 per cent v. 0 per cent)—with the absorbable suture. But these differences were not significant at the 0.05 level and might well disappear with more operative experience, particularly the modified technique of knot-tying.

In handling qualities Vicryl was superior to both 10-0 monofilament nylon and 8-0 virgin silk with the exception of knot-tying, in which it was inferior to 8-0 virgin silk. Vicryl is considered to be a useful absorbable suture in cataract surgery but knot-tying requires modification of technique.