Better postoperative comfort with smaller gauge vitrectomy

The goal of treatment in both groups was removal of the posterior hyaloid and 70 to 80 per cent of the vitreous. All surgeries were performed by experienced vitreoretinal surgeons who had carried out vitrectomy in five to 10 cases with smaller instrumentation before entering the study.

In those undergoing 20-gauge procedures, surgeons used Alcon or Oertli instruments with suction levels from 150-200 ml/min and cutting rates from 1200-1500 cuts/min. In those undergoing 23-gauge and 25-gauge procedures, they used Alcon, Oertli or Dorc instruments. Suction was raised to 250-300 ml/min with 23-gauge and to 400-500 ml/min with 25-gauge. The cutting rate of the 25-gauge vitrectomy probe was 1200-1500 cuts/min and that of the 23-gauge instrument was 1600-2500/min.

All three groups had similar and significant changes in visual acuity at three months as tested by ETDRS and Radner charts. Conjunctival injection and subjective postoperative pain scores showed significantly lower irritation in the 25-gauge group and 23-gauge group.

Similar surgery times

There was no significant difference between the groups in the total duration of surgery, with the time gained by quicker wound opening and closure in the 23-gauge and 25-gauge groups being lost through the longer duration of vitreectomy.

Hypotony rate higher with smaller gauge

In terms of complications, the rate of hypotony during the first postoperative days was significantly higher in the smaller-gauge treatment groups but there was no difference between the groups regarding IOP after one week.

Complications in the 20-gauge group included a small number of cases of transient vitreous haemorrhage and retinal detachment in the second study. In the second study there was one case of vitreous haemorrhage through a sclerotomy, which required immediate re-vitrectomy, and one case of transient postoperative vitreous haemorrhage.

Although there were no complications apart from hypotony in the 25-gauge group, there were significantly more technical difficulties compared to the 20-gauge group. The difficulties in the 25-gauge group included insufficient illumination, dense vitreous entrapment in the trocar system because the cutter was too weak and insufficient suction. In five cases it was necessary to switch from 25-gauge to 20-gauge instruments.

“New small incision sutureless vitrectomy systems offer higher comfort to the patient. However, there is no gain in time, if equal amounts of vitreous are removed and visual acuity is the same at three months. Avoiding postoperative hypotony is important, to minimise risk for haemorrhage or endophthalmitis,” she summarised.

Fewer complications with 23-gauge than 25-gauge

Another study presented at the congress compared 23-gauge and 25-gauge and indicated that while both approaches enhance the postoperative recovery, complications, particularly hypotony, were more frequent in procedures performed with the 25-gauge system.

In the retrospective study, Zoran Tomic MD and his associates compared a consecutive series of 150 eyes treated using 23-gauge technique with a consecutive series of 150 operated eyes using 23-gauge technique. The 25-gauge series mainly included simple cases, such as macular pucker and macular hole, whereas the 23-gauge series included more complex cases, such as retinal detachment, proliferative diabetic retinopathy, and giant tears.

“Good instrumentation in both series made it possible to apply almost all of the standard procedures excluding perfluorocarbon liquid and silicone oil injection which were applied in the 23-gauge series exclusively” Zoran Tomic MD

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“The surgeons also commented that they found 23-gauge instruments comparable to 20-gauge in terms of illumination and the ease with which they can be manipulated and rotated. The vitreous cutters provided closer cutting to the retina because of the port being closer to the tip. On the other hand, as with 25-gauge instrumentation, the 23-gauge trocars require a learning curve.”

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With 23-gauge you have the tunnel incision and there is no leakage. It seems that the angle and shape of the hole is more important than the size. I think that the most important thing for preventing hypotony is the bevelled entry approach and, for re-operation, air tamponade or suturing,” Dr Tomic added.

**Expanding role for 25-gauge**

Periklis D Brazitikos, MD told the congress that 25-gauge has not been rendered obsolete by 23-gauge vitrectomy surgery but in fact continues to have an expanding role as new and improved instrumentation becomes available.

“The main advantages of 25-gauge pars plana vitrectomy, apart from the greater postoperative comfort due to sutureless surgery, are related to the safer procedure itself. I have not seen a sclerotomy-related retinal break, intra-operatively or postoperatively in more than 600 25-gauge cases that I have performed,” said Dr Brazitikos, Aristotle University, Thessaloniki, Greece.

He added that the smaller lumen diameter of the 25-gauge vitreous cutter and the improved fluidics now available result in a tractionless cutting, even in close proximity to the retina. Moreover, the 25-gauge elongated and thinner cannulas do not allow incarceration of visible amounts of vitreous, he said.

In addition, the tiny 0.5mm incisions make it an easier decision for a surgeon to make a fourth sclerotomy in order to insert a separate torpedo illumination probe for performing bimanual surgery, he noted. The smaller incisions also make the technique preferable for eyes that have undergone several previous surgeries.

Furthermore, while 23-gauge cutter may be more efficient, its use also entails a higher risk of vitreous incarceration in sclerotomies and the need for valve placement in 23-gauge cannulas to avoid intraoperative hypotony, he said.

**New improvements address former drawbacks**

Dr Brazitikos pointed out that recent improvements in instrumentation and technique have successfully addressed most of the original drawbacks of the 25-gauge approach. For example, while in the early days of the technology there was only a limited amount of instruments available, while now there is a whole range of new instruments in 25-gauge format.

Modern 25-gauge vitrectomy instrumentation includes brighter X enon light sources, wide-angle illumination probes and torpedo lights for a chandelier effect. There are also new conformal horizontal scissors, end gripping, serrated forceps, multidirectional laser probe and diathermy probes.

Another complaint about 25-gauge vitrectomy has been the high flexibility of the instruments. However, surgeons can overcome this problem by employing a bimanual technique, using one hand for the vitreous cutter and the other for scleral indentation.

In addition, surgeons can avoid the problem of sclerotomy leakage sometimes encountered with 25-gauge systems by using conjunctival mobilisation and angled trocar insertion.

Dr Brazitikos said indications for which 25-gauge might now be used to good advantage range from simple retinal detachments to more complex cases such as those with thick post-traumatic vitreous haemorrhage and those with thick diabetic fibrovascular tissue.

“Due to improvements in 25-gauge surgical techniques and instrumentation I have switched to 25-gauge pars plana vitrectomy in almost 100 per cent of the cases for the past year,” he added.