Transscleral drainage of subretinal fluid revisited

Fashioning a puncture hole through the sclera, choroid, Bruch's membrane, and retinal pigment epithelium for external drainage of subretinal fluid (SRF) may not be conceptually challenging, but the multiplicity of reported methods attests to the problems experienced in achieving the desired end simply and without extraocular egress of the retina or intraocular complications. The latter include retinal perforation and choroidal haemorrhage with subretinal or suprachoroidal spread. Until recently, the relative efficacy and safety of these various SRF drainage procedures had seldom been investigated through clinical trials, perhaps reflecting the variability of presentation of rhegmatogenous retinal detachments and the influence of the charismatic schools of vitreoretinal surgery in shaping opinions.

Incremental deepening of a 2–4 mm long scleral incision[1–10] permits choroidal exposure, visualisation and possible coagulation before choroidotomy, but necessarily invokes a risk of inadvertent choroidal puncture, retinal incarceration, and potential reopening of the sclerotomy at reoperation. By contrast, the much smaller sclerochoroidal opening after hypodermic needle or suture needle drainage[11–13] virtually eliminates the risk of incarceration while inviting choroidal haemorrhage unless the intraocular pressure is maintained high enough and long enough for haemostasis to become established. After scleral cutdown, the choroid can be coagulated by cautery or diathermy[2 5 6] before mechanical puncture; alternatively, choroidal vaporisation without intrusion using either diathermy[6] or an argon laser (via a fibreoptic probe or the indirect laser delivery system)[7–10] aims to reduce the risk of haemorrhage, retinal perforation, or failure of drainage. Although initial lower energy, longer duration coagulation of the choroid tends to reduce choroidal haemorrhage on subsequent vaporisation,[2 6 9] it also lowers the rate of first time success of SRF drainage[9] while retinal perforation remains a possibility.[8 9] The risk of haemorrhagic complications is also felt to reflect the site of SRF drainage – that is, with a reduced risk at the watershed of vortex vein territories near the horizontal (as opposed to the vertical) recti,[4 5 14] and the sequence of individual retinal procedures – that is, with a putative benefit from drainage *before* cryotherapy.[4 13 14] However, few of these nostrums have been supported by substantive evidence through clinical trials. Prospective studies tend to be more objective than retrospective studies, a healthy scepticism ensuing when a retrospective search of patient records is reported to reveal no drainage complications and 100% reattachment.[6] Furthermore, independent, extended use of a particular technique (such as hypodermic needle drainage[12 14]) may fail to endorse initial enthusiasm, but sometimes reflects difficulties in general applicability of the method or faults in following technical guidelines.

Given the inappropriateness of historical comparisons, prospective randomised controlled trials of different SRF drainage procedures[10 14] have been informative, albeit none has employed masked observers. No major disparity in haemorrhaging was observed between laser drainage and needle choroidotomy (without choroidal coagulation) in a recent trial by Ibanez and others.[10] But, in this issue of the *BJO*, Aylward and colleagues (p 724) report that their trial comparing argon laser choroidotomy with suture needle sclerochoroidal perforation was terminated early when an interim data analysis revealed 'a large and statistically significant difference in the incidence of clinically significant subretinal haemorrhage between the two groups'. They had observed a 28·3% incidence of 'small or large' haemorrhages (that is, those over one disc area in size) in the suture needle drainage group compared with only 4·3% in the laser choroidotomy group. However, this was perhaps an unduly precipitate conclusion to the study. Submacular haemorrhage and retinal incarceration are arguably the most 'clinically significant' indices of hazard from any SRF drainage technique, while peripheral subretinal haemorrhage is not necessarily a risk factor for surgical failure[1] or development of proliferative vitreoretinopathy.[3] Thus, using these alternative criteria, they would have found no significant difference between the two techniques at that juncture. Also, notwithstanding earlier comments about historical comparisons, their 28·3% incidence of subretinal haemorrhage (and 12·5% incidence of submacular haemorrhage in macula off detachments) after suture needle drainage differs markedly from the 7·4% and 0% incidence respectively in a previous report.[13] The propensity to submacular haemorrhage depends on the relative densities of blood and SRF (with viscous long standing SRF slowing the gravitational flow of blood beneath the macula) but also on the method used to limit the choroidal haemorrhage once initiated. Aylward and colleagues closed the drainage site when haemorrhage occurred during suture needle drainage, thus preventing egress of blood along with SRF and thwarting the flattening of the retina which might have discouraged settling of haemorrhage under the macula.

The Moorfields trial does, however, point to the need to develop an SRF drainage method which combines the ease and convenience of suture needle drainage with the more secure haemostasis deriving from laser choroidotomy. This has been achieved experimentally using carbon dioxide laser sclerochoroidotomy[15] and holds promise clinically using the transscleral diode laser to coagulate the choroid before suture needle drainage[16] and diode laser retinopexy. Let us look forward, then, to a prospective, randomised, controlled trial to establish the true worth of this method. In the meantime, retinal surgeons using direct sclerochoroidal perforation for SRF drainage will have to judge for themselves whether wholesale conversion to laser choroidotomy is warranted from the available evidence.

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