Fundoscopy: to dilate or not to dilate?

The risk of precipitating glaucoma with mydriatic eye drops is very small

Fundoscopy is commonly used by non-ophthalmologists to screen for diabetic retinopathy.[1] The sensitivity of fundoscopy through a dilated pupil for detecting diabetic retinopathy is twice as high as detection through an undilated pupil,[2] but surveys of general practitioners have found that only 1 in 250 regularly dilate pupils, even when assessing patients at high risk of diabetic eye disease.[3] A common reason for not dilating pupils is concern about the risk of precipitating acute angle closure glaucoma.[3] How big is this risk?

Recent population based studies indicate that this risk is extremely low. In the Rotterdam study of 6760 people, routine use of mydriatic eye drops in all participants aged 55 and over precipitated acute angle closure glaucoma in only two individuals (0.03%).[4] The Baltimore eye survey of 4870 people found no cases of acute glaucoma precipitated by mydriasis.[5] In Australia the Blue Mountains eye study of 3654 people also found no cases of acute angle closure glaucoma resulting from routine pupil dilation (PM, unpublished data). Although some cases may have been missed as participants were not monitored until the effects of mydriasis wore off, the authors of all three studies believe this to be extremely unlikely. Participants in all the studies were given clear instructions to contact the investigators or a medical practitioner immediately if symptoms of acute glaucoma developed, and although several notifications of minor eye irritation were received, none were found to be caused by acute angle closure glaucoma, other than the two cases in the Rotterdam study. Cross checking with doctors and ophthalmologists in the study areas also did not reveal any extra cases of mydriatic induced acute glaucoma in study participants.[4 5]

A systematic review reported that out of an estimated 600 000 individuals who received mydriatic eye drops, 33 (0.006%) developed acute angle closure glaucoma, giving an estimated risk of 1 in 20 000.[6] The same review found that in almost 4000 people whose pupils were dilated using tropicamide, none developed acute glaucoma as a result of the dilatation. We are aware of only two cases of tropicamide-induced angle closure glaucoma from the published literature.[7] Thus, these studies place the risk of acute angle closure glaucoma caused by pharmacological pupil dilation at 1 to 6 per 20 000 people in the general population.

Even in traditional high risk groups, the risk of precipitating acute glaucoma with mydriatic eye drops has been found to be very low. In 13 studies involving over 1000 people with chronic open angle glaucoma, none developed acute glaucoma after mydriasis (0%).[6] In the Rotterdam study one out of 149 subjects (0.7%) with flat anterior chambers on slit lamp examination developed acute glaucoma after mydriasis,[4] while in the Baltimore eye survey, all of the 38 subjects determined by an ophthalmologist to have potentially occludable angles were dilated without incident, although 10 had received laser iridotomy before dilation.[5] These two studies also found that the predictive value of a history of open angle glaucoma or a flat anterior chamber in predicting acute angle closure glaucoma after mydriasis was extremely low (< 1%). The authors of both studies recommend that in a primary care setting warning patients to seek immediate treatment if symptoms of acute glaucoma develop would be more effective than screening for potentially occludable angles.[4 5]

Few published data exist on Asian populations, whose risk of angle closure is believed to be higher, but a study of 1232 Chinese Singaporeans, where none developed acute glaucoma after mydriasis, puts the risk in Chinese Asians at less than 1 in 1000.[8] In another study in 2400 Malay Singaporeans one participant developed acute glaucoma, giving a risk of 1 in 2400 in Malay Asians.[9]

There are good pathophysiological reasons why mydriasis is unlikely to lead to acute glaucoma. Pupil block, the underlying mechanism in acute angle closure, is believed to occur when the pupil is in the mid-dilated position, rather than a fully dilated position.[10] In fact, the pupil is in a mid-dilated position in dimly lit environments, which paradoxically suggests that being in a darkened room poses more risk in terms of precipitating acute glaucoma than instilling mydriatic eye drops.

Pupil dilation is important for thorough fundoscopy, and the risk of precipitating acute angle closure glaucoma with routine use of mydriatics is close to zero. Tropicamide 0.5% is a safe agent for use in primary care.[6] While patients should certainly be warned to seek medical attention if the symptoms of acute angle closure glaucoma (red painful eye, blurry vision, nausea and vomiting) occur, both the patient and doctor should rest assured that this possibility is extremely slight.

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