

in the great majority of cases by severe operative procedure, and often uncontrollable even by the most radical measures. To hasten or bring about an acute manifestation of such a disease in an eye hitherto apparently free from it, must always be to the surgeon an occasion of deep annoyance and regret. And well-attested cases show that each mydriatic, with the possible exception of cocaine, is liable to produce such acute manifestations in the course of this disease. To use a mydriatic in an eye suffering from an acute outbreak of primary glaucoma, as, I regret to say, I have known to be done, is to be guilty of practice comparable to the feeding of a typhoid fever patient on violent purgatives or practicing free venesections on one in collapse. I will not here rehearse the symptoms of glaucoma; but remember, that it is a disease of middle and advanced life, that it often presents a pericorneal zone of hyperæmia, and may otherwise closely simulate some of the conditions in which mydriatics are most strongly indicated.

A second contraindication to its use is the interference with vision which a mydriatic occasions. The importance of this is to be weighed with the circumstances of each individual case, and such a mydriatic should be chosen, and it should be so applied, that the inconvenience may be reduced to the minimum. But it is always to be remembered that when a patient comes to a physician, he has generally made up his mind that his trouble is serious enough to warrant some expenditure of time and money to get relief, and that to get the clearest possible conception of his case is the first duty the physician owes his patient.

Of contraindications in eyes manifestly diseased may be mentioned, besides glaucoma, ulcers perforating the cornea at or near its periphery, where myotics will often be more useful.

Diagnostically, mydriatics are used to dilate the pupil, to determine the condition of the iris or the structures back of it, or to paralyze the accommodation. In normal eyes, to fully dilate the pupil requires very much less of the drug than to paralyze the accommodation. Simply to dilate the normal pupil, a single drop of either of the following solutions will suffice:—

Cocaine hydrochlorate, gr. j, water, mxxv,  
or about 1 to 25;  
Homatropine hydrobromate, gr. j, water, f ̄j,  
or about 1 to 500;  
Atropine sulphate, gr. j, water, f ̄j, v,  
or about 1 to 2500;  
Duboisine sulphate, gr. j, water, f ̄j, x,  
or about 1 to 5000;  
or daturine, hyoscyamine, or hyoscine salts used,  
of the same strength as duboisine.

Of the above the homatropine solution will render the pupil rather the most rigid, and its effects will pass off in from twenty to fifty hours. But *cocain* is the most generally valuable dilator of the pupil. The dilatation it produces lasts but ten or twenty hours, is never so great in strong as in

feeble light, so that there is less annoyance from exposure to the light; it produces proportionately the smallest impairment of accommodation, interfering least with near vision; and the dilatation it produces can be promptly overcome by the use of eserine, making it especially valuable after middle life, when there is a chance of the occurrence of glaucoma. And it is after middle life that a dilator of the pupil is most frequently needed; for as age advances the pupil normally grows smaller, and at the same time there is an increasing liability to those degenerative changes in the posterior-media and coats of the eye that require a somewhat dilated pupil for their thorough study. But this drug has yet another advantage. In spite of the readiness with which it yields to myotics, in spite of its inability to entirely prevent the reaction to bright light, tested in a weak or moderate light, *cocaine produces a wider dilatation of the pupil than any other mydriatic*. And this superior power of cocaine is especially manifest in old people, whose pupils often do not dilate well under other mydriatics.

Paralysis of accommodation is produced both as a diagnostic and as a therapeutic measure. It is not, as a rule, called for after fifty, although some cases do occur after that age in which such an action of a mydriatic is absolutely necessary. The difficulty of producing complete paralysis of accommodation does not greatly diminish with the approach of the age at which the power of accommodation is lost. The strength of solution required is not materially less at forty-five than at fifteen. And this is not surprising when we remember that accommodative power is lost primarily by increased resistance in the lens, rather than diminished power in the ciliary muscle. Yet early childhood, probably because of interference with the absorption of the drug and extreme activity of excretion, presents special difficulty in securing complete abeyance of the function of the ciliary muscle.

To completely paralyze the accommodation usually requires from two to five instillations of a drop of either of the following solutions:—

Homatropine hydrobromate, gr. x, water f ̄j,  
or about 1 to 50;  
Atropine sulphate, gr. iv, water f ̄j, j,  
or about 1 to 120;  
Duboisine sulphate, gr. ij, water f ̄j;  
or about 1 to 240;  
or daturine, hyoscyamine, or hyoscine in the same strength as duboisine. Homatropine should be instilled at intervals of from five to fifteen minutes; with the other mydriatics, to avoid constitutional effects, the intervals must be much longer. Cocaine in any strength cannot, in most cases, completely control the accommodation.

Of the above, for diagnostic purposes, homatropine is greatly to be preferred. It reduces to a minimum the period of disability for eye work, recovery from it being nearly complete in from thirty-six to forty-eight hours against five or six