

We believe, therefore, that intravenous lignocaine should not be used in atrial flutter with block unless there is overwhelming evidence of digitalis intoxication.

We wish to thank Dr. T. A. Kemp for permission to publish the details of this case.

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## Ocular Damage Due to Paraquat and Diquat

*Brit. med. J.*, 1968, 2, 224

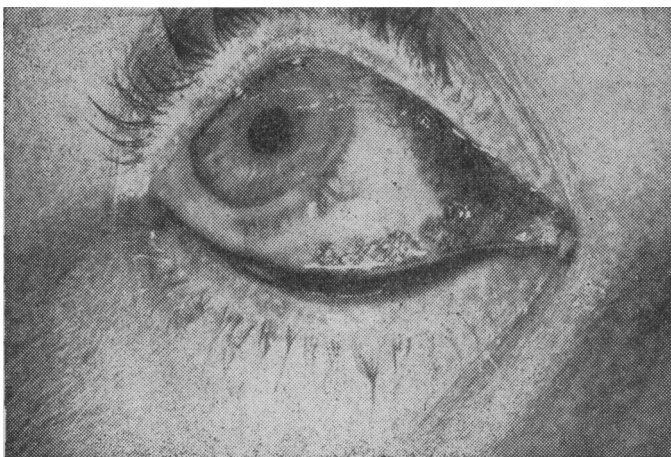
Paraquat and diquat are dipyrilidium compounds which act as herbicides and desiccants, and are widely used in agriculture for the control of weeds in plantation crops and occasionally for defoliation before harvesting.

Dipyrilidium compounds have been shown in experimental animals (Clark, McElligott, and Hurst, 1966) and in three fatal cases (Bullivant, 1966; *Brit. med. J.*, 1967) to produce specific changes of an irreversible nature in the lungs. While the systemic effects are documented and skin irritation has been noted (*Brit. med. J.*, 1967) it is less commonly recognized that they may cause serious damage if they come into contact with the eye. No case of ocular damage due to diquat or paraquat has been described, and as these substances are being used with increasing frequency attention should be drawn to their serious local ocular effects by reporting the following case.

### CASE REPORT

The patient, a 36-year-old farmer, reported that while mixing Preeglone Extra fluid concentrate (a paraquat/diquat mixture) with water he splashed some solution on to his right eye and eyelids. He noticed slight irritation and washed the eye with water. Over the next three days mild irritation occurred, and he consulted his family doctor. One week later the eye became considerably more irritable and his admission to hospital was arranged.

On admission his eye had extensive loss of bulbar conjunctiva around all aspects of the globe with associated loss of more than 50% of tarsal conjunctiva of the lower eyelid and a smaller loss of that of the upper eyelid. The denuded areas were clean (see Fig.). The corneal epithelium beside the limbus was destroyed in all quadrants and the remainder of the corneal epithelium was



Right eye, showing extensive loss of conjunctiva.

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oedematous. There was a low-grade reactive anterior uveitis. The skin of the eyelids and surrounding area was not affected.

He was treated initially with chloramphenicol ointment and 1% atropine drops and the eye was covered. After four days, during which no change occurred and the possibility of a conjunctival graft was actively considered, healing of the denuded areas began and progressed steadily until his discharge from hospital 11 days later. The corneal epithelium healed and the uveitis subsided. During his period of treatment there was a tendency to adhesion between the opposing denuded surfaces, and these had to be repeatedly separated to prevent permanent adhesion with obliteration of the conjunctival fornices.

### COMMENT

The proprietary preparation Preeglone Extra contains equal proportions of paraquat and diquat plus a surface-active agent. As these compounds are of similar chemical formulation they probably have a similar and equal effect on the eye. This effect is particularly dangerous, since the action is insidious, the full extent of the damage due to a single splash of the solution not being apparent for over one week.

It has been noted in experimental work on rabbits that after the instillation of an aqueous solution of paraquat dichloride into the conjunctival sac no initial irritation was evident, but mild inflammation of the conjunctiva and nictitating membrane followed within 12 hours and persisted for 48 to 96 hours though no corneal damage resulted (Clark *et al.*, 1966). This is in contrast to most chemicals causing ocular burns, which have an immediate action, and some continue to produce damage over a period of time after a single application.

It is remarkable that one relatively minor splash of the preparation, possibly in aqueous solution, which initially produced only transient ocular discomfort and no surrounding skin damage, caused a serious ocular burn. In this respect the ocular burn was similar to that produced by an alkali, which becomes bound to the tissues of the eye, but, unlike alkali burns, the effect was very slow and there was no immediate damage.

In view of the damage produced by an apparently trivial splash on the eye, paraquat and diquat should be handled with caution. The delayed effect of an ocular burn should be emphasized, and as irrigation of the eye is apparently rendered ineffective by the presence of a surface-active agent it must be understood that treatment is difficult.

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