PARAQUAT POISONING IN WESTERN SAMOA, 1977-78:
A PRELIMINARY ASSESSMENT OF THE EFFECT OF PP796

INTRODUCTION

The medical authorities of Western Samoa proposed a total ban on the sale of all paraquat formulations in the islands early in 1977. The reason for their proposed action was the rising rate of self-poisonings using these products and for which there was no effective therapy. Dr R E Davies (Chief Medical Officer, ICI Australia) and the author, in company with Mr David Browne of ICI Tasman Vaccine, went to Western Samoa in April 1977 in order to discuss the matter with those concerned with the paraquat problems, both in the Health Department and the Department of Agriculture. Agreement was reached that the ban would be rescinded on the assurance from ICI that all future shipments of 'Gramoxone' would contain the new emetic PP796.

The new formulation was first shipped to Western Samoa in May 1977 but, for a variety of reasons, the second shipment was not sent until August 1977. As a result of this delay, stocks of the new formulation ran out and old stock was sold from the Government Agricultural Store in Apia. However, since August 1977 the emeticised 'Gramoxone' has been sold as required. The indications thus far would seem to indicate that while only the new formulation is now being sold, there exist significant stocks of the non-emeticised formulation in the countryside which are being used for self-poisonings.

MATERIALS AND METHODS

Dr W I Glass (Medical Adviser, ICI Tasman Vaccine) and Dr R E Davies have examined the hospital case records of all poisonings attributed to paraquat from January 1977 to May 1978 which were admitted to the Redacted - EU PII Redacted - EU PII. Wherever possible details of the amount ingested and the start of treatment and the pattern of symptoms was recorded. In this regard particular attention was paid to the record of whether or not the patient vomited, the extent of the vomiting and the time of onset after ingestion of 'Gramoxone'. Details of investigations were also noted together with the eventual outcome and the time after ingestion that death occurred in fatal cases.

In all cases treatment was limited to gastric lavage with the administration of Fuller's Earth and purgatives. There are no facilities for the more sophisticated techniques of haemodialysis or haemoperfusion.

The case records were given preliminary analysis by Drs Glass and Davies and the abstracts of the case notes containing the essential information were forwarded to the author.

RESULTS

The hospital records suggested that there were 37 cases of paraquat poisoning in the period January 1977 to May 1978. However, two of these were mistakenly recorded and did not involve paraquat but some other pesticide.

ALL CASES

A further two patients absconded from the hospital before treatment completed and two more were still under treatment at the time the data was being collected. As the final outcome was not known in these cases they were omitted from the series. A further ten cases were also omitted as the history, including satisfactory outcome without treatment, clinical picture and other factors, indicated that only trivial amounts of paraquat had been ingested. One of these cases may have ingested a small amount of the emeticised formulation, but the long delay before the patient was actually seen at hospital and the somewhat scanty history confuse the issue.

The remaining twenty-one cases comprised fifteen males and six females. There were thirteen deaths giving an overall mortality of 61•9%. The clinical data is highly suggestive that nine of the twenty-one cases ingested the emetic formulation. Of these 6 died, giving a mortality rate of 66•6%. The remaining twelve cases are presumed to have ingested the non-emeticised 'Gramoxone' (referred to hereafter simply as 'Gramoxone' whilst the emetic formulation will be referred to as 'Gramoxone E'). There were seven deaths in the group giving a mortality of 58•3%. The mortality data are set out in Tables 1 and 2 for both formulations related to dosage. The information was insufficient to relate dosage and time between ingestion and treatment, although the indications are that effective treatment was invariably instituted in under 5 hours where significant doses had been taken. All cases, who had ingested more than 6 gm paraquat ion, died.

DISCUSSION

The mortality from 'Gramoxone' ingestion in Western Samoa has always been consistently lower than in the UK, where the mortality rate from purposeful ingestion approaches 90%. The Western Samoan series includes accidental ingestions as well as deliberate self-poisonings, but even if these are removed the mortality rate only rises to 66%. The explanation may well lie in the fact that fifteen of the twenty cases were treated within 5 hours of ingestion thus greatly improving their chances of survival.

The data in respect of 'Gramoxone E' are disappointing. It has to be stated that the decision on which formulation had been ingested was based on the clinical data alone. However, three clinicians acting independently of each other made identical assessments and the important factor in each of the nine cases assigned to 'Gramoxone E' was the early onset of significant vomiting. The total numbers are relatively small and it would be foolish to attempt to draw firm conclusions from the limited data available. Nonetheless, it would appear that the early onset of emesis after ingestion of paraquat does not play a part in reducing mortality. There is also no evidence, at this stage, that the addition of PP796 has had any effect in increasing the range of treatable dose. All those who ingested more than 6 gm of paraquat ion died, whether there was significant vomiting or not.

These results would suggest that hopes for a dramatic change in mortality patterns following the introduction of PP796 in 'Gramoxone' formulations are unlikely to be fulfilled. However, firm conclusions must await harder data based on the analysis of urine samples for metabolites of PP796. Only when such results are available will it be possible to state unequivocally which formulation was ingested and to build up firm data on this basis.

J K Howard
Division Medical Officer
ICI Plant Protection Division

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BLE 1 MORTALITY FROM PARAQUAT POISONING RELATED TO FORMULATION AND DOSE INGESTED

ALL CASES

Dose (gm ion)	At risk	Deaths	Mortality (%)
Less than 3 gm	3	0	0
3 - 6 gm	4	3	75
More than 6 gm	7	7	100
Total	14	10	71•4

'GRAMOXONE'

Dose (gm ion)	At risk	Deaths	Mortality (%)
Less than 3 gm	1	0	0
3 - 6 gm	1	0	0
More than 6 gm	5	5	100
Total	7	5	71•4

'GRAMOXONE E'

Dose (gm ion)	At risk	Deaths	Mortality (%)
Less than 3 gm	2	0	0
3 - 6 gm	3	3	100
More than 6 gm	2	2	100
Total	7	5	71•4

TABLE 2 MORTALITY FROM PARAQUAT POISONING RELATED TO FORMULATION WHERE DOSE UNKNOWN

	At risk	Deaths	Mortality (%)
All cases	7	3	42•8
'Gramoxone'	5	2	40•0
'Gramoxone E'	2	1	50•0