

possible to be more precise than to classify the therapeutic effect of a drug as satisfactory, fair, or poor.

### Summary

The relative therapeutic value of orphenadrine and UK.738 was studied by means of a double-blind trial. Orphenadrine 100 mg. thrice daily produced satisfactory results in 15 out of 24 patients, and thus was much more effective than UK.738 4 mg. thrice daily.

Simple quantitative data were collected relating to strength of grip, range of active and passive movement of the neck, and the ability to write. It was shown that such quantitative tests and other objective evidence can be of value in assessing the therapeutic value of drugs used in Parkinsonism.

It was shown that after oral administration of orphenadrine peak activity occurred in about two hours whereas peak activity due to benzhexol occurred in two to three hours. It was not possible to demonstrate clearly a similar peak of activity for UK.738.

It follows that when the relative merits of drugs are being determined by objective testing due regard should be paid to the phase of maximal activity, otherwise the findings will not be comparable.

Fallacious results are also attributable to failure to appreciate the far-reaching effects of emotional upsets in these patients; and their lack of practice in experimental procedures also makes for unreliable data.

I am indebted to Professor S. Alstead for allowing me to study patients under his care, for his guidance, and for his helpful criticism of the manuscript. My thanks are due to Dr. J. C. Brocklehurst, who was closely associated with me in this work, for his help and advice. I am also indebted to Sister E. Biggin and Sister M. Quigley and their staff for their willing co-operation; to the pharmacists for supervising the issue of the drugs in accordance with the scheme for a double-blind clinical trial; to Mr. P. Waldie for preparing the illustrations; and finally to the patients for their willing co-operation in this study. I am also obliged to Messrs. Sandoz Laboratories for supplying the preparation UK.738 and placebo tablets.

### REFERENCES

- Agate, F. J., Doshay, L. J., and Curtis, F. K. (1956). *J. Amer. med. Ass.*, **160**, 352.
- Alcock, N. S., and Carmichael, E. A. (1938). *Quart. J. Med.*, **7**, 565.
- Berkowitz, B., and Alvermann, E. (1952). *Arch. Neurol. Psychiat. (Chic.)*, **67**, 462.
- Cooper, I. S., Bravo, G. J., Riklan, M., Davidson, N. W., and Gorek, E. A. (1958). *Geriatrics*, **13**, 127.
- Critchley, M. (1958). *Brit. med. J.*, **2**, 1214.
- Doshay, L. J., and Constable, K. (1957). *J. Amer. med. Ass.*, **163**, 1352.
- Eliasson, S., and Tejning, S. (1956). *Acta med. scand.*, **154**, 375.
- Gillhespy, R. O. (1956). *Brit. med. J.*, **2**, 361.
- (1960). *Indian Practit.*, **13**, 763.
- and Ratcliffe, A. H. (1955). *Brit. med. J.*, **2**, 352.
- (1956). *Bgham med. Rev.*, **19**, 115.
- Gillingham, F. J., Watson, W. S., Donaldson, A. A., and Naughton, J. A. L. (1960). *Brit. med. J.*, **2**, 1395.
- Hall, A. J. (1937). *Ibid.*, **1**, 795.
- Hill, D. (1938). *Lancet*, **2**, 1048.
- Moore, M. T. (1951). *Neurology (Minneapolis)*, **1**, 123.
- Neuwahl, F. J., and Fenwick, C. C. (1937). *Lancet*, **2**, 619.
- Onuagoluchi, G. (1961). *Scot. med. J.*, **6**, 368.
- Parkinson, J. (1817). *Essay on the Shaking Palsy*. Sherwood, London.
- Robinson, L. R., and Dick, T. H. C. (1960). *Ulster med. J.*, **29**, 64.
- Schwab, R. S., and Leigh, D. (1949). *J. Amer. med. Ass.*, **139**, 629.
- and Prichard, J. S. (1951). *Arch. Neurol. Psychiat. (Chic.)*, **65**, 489.
- Vollmer, H. (1940). *Ibid.*, **43**, 1057.
- Wachs, H., Brumlik, J., and Boshes, B. (1960). *J. nerv. ment. Dis.*, **131**, 32.
- Webster, D. D. (1960). *Neurology (Minneapolis)*, **10**, 157.

## TWO FURTHER CASES OF CURLING'S ULCER IN MAJOR BURNS IN CHILDREN

BY

M. CHOUDHURY, M.B., B.S.

Junior House Medical Officer, Burns and Plastic Unit,  
Booth Hall Children's Hospital, Manchester

The occurrence of ulceration of the intestinal tract as a complication of burns has long been recognized. Although this association had previously been described by Swan (1823), Dupuytren (1832), Cooper (1839), and Long (1840), the description by Curling in 1842 attracted greater attention, and the lesion has since that time usually been referred to as "Curling's ulcer." His comprehensive report of 10 cases concerned solitary ulcers of the duodenum only, but among more than 150 cases reported since that time there have been instances of oesophageal, gastric, duodenal, and ileal ulceration, sometimes multiple.

### Case 1

A girl aged 12 was admitted to this hospital on December 31, 1960, with extensive clothing burns involving about 40% of the total body surface, mostly full-thickness loss. The areas affected were the lower part of the face, front of neck, the chest, upper two-thirds of the abdomen extending to the left half of the back, both upper limbs to the tips of the fingers, and half of the left thigh. There was no history of gastro-intestinal symptoms prior to the injury and no organic disease was evident.

The patient was resuscitated adequately by intravenous replacement therapy and given a course of intramuscular penicillin. Local treatment consisted of occlusive absorbent dressing and minimum debridement under an anaesthetic. Because of persistent pyrexia and urinary infection she was later given a course of oral chloramphenicol followed by sulphadimidine. From the beginning she was given a high-calorie, high-protein diet. Although her general condition remained satisfactory it was not possible to undertake grafting because of the presence of fat necrosis.

During the evening of February 9, 1961, she passed altered blood per rectum, followed an hour later by about 3 oz. (85 ml.) of blood clot. For the previous fortnight she had passed loose stools on a number of occasions, but culture failed to isolate any causative organisms. On February 10 she passed fresh blood and clots repeatedly per rectum, and next day haemorrhage became almost continuous. Despite repeated vomiting there was no haematemesis. Blood loss was replaced by continuous transfusion of whole blood amounting to 6 pints (3.4 litres) in 24 hours. Surgical intervention was not undertaken in view of grossly infected abdominal burns and the patient's poor general condition.

Sigmoidoscopy was performed to exclude pathological conditions in the lower large intestine, but it was negative. A blood count on February 11 gave the following results: haemoglobin 55% (8.1 g./100 ml.); total leucocytes 19,800/c.mm., polymorphs 84%, eosinophils 4%, monocytes 8%, metamyelocytes 4%); bleeding-time 80 seconds; clotting-time 1½ minutes; platelets 420,000/c.mm.

During the next two days the patient's condition improved slightly, and by February 13 the bleeding had stopped. Some of the healthy granulating areas were covered with autografts on February 14. Towards that evening the patient again passed fresh blood per rectum. Her condition rapidly deteriorated and she died shortly afterwards. Swabs from the burned areas taken a few days before death yielded

beta haemolytic streptococci; *Staphylococcus aureus*, *Proteus*, and *Pseudomonas pyocyaneas*.

**Necropsy Findings.**—An ulcer was present in the second part of the duodenum above the opening of the bile-duct, partly adherent to the pancreas. The ulcer had perforated into the lesser sac of the peritoneum, which was full of blood-clot and pus, and there was necrosis of the adjacent viscera. The exact source of the bleeding could not be determined because of the necrosis present. The large bowel contained much blood. There were abscesses in the lower lobe of the left lung, with overlying purulent pleurisy and adhesions to the diaphragm.

### Case 2

A boy aged 2 years was transferred to this hospital on August 25, 1961, some 48 hours after sustaining severe clothing burns and having had initial replacement therapy with plasma and blood transfusions.

On examination the burns involved 50% of the total body surface (about 40% full thickness): the lower part of the face, the entire neck and chest, the abdomen and back up to the umbilicus, the upper limbs down to the wrists, one-third of the right lower limb, and a small area over the left thigh. The skin was leathery-brown in appearance, with visible thrombosis of the subcutaneous veins. The child had been in good health previously, apart from a tendency to respiratory infections.

On admission the child was pale and somewhat shocked, with a subnormal temperature (97.5° F. (36.4° C.) rectal) and rapid, thready pulse (140/min.). Haemoglobin was 123% (18.2 g./100 ml.) and P.C.V. 52%. Adequate resuscitation was carried out by intravenous fluids and a course of oxy-tetracycline was begun. Local care consisted of treatment by the exposure method. The boy showed slight improvement by the next morning but had vomited twice during the night. Towards the evening of August 26 he developed restlessness, irregular breathing, and involuntary twitching of the limbs. He passed one tarry stool at 10 p.m. His serum chemistry at this time was as follows: Na, 152 mEq/l.; K, 3.25 mEq/l.; Cl, 107.5 mEq/l.; CO<sub>2</sub>-combining power, 37 vols./100 ml.; blood urea, 121 mg./100 ml.

During the next three days he passed numerous melaena stools, and his general condition deteriorated despite blood transfusion.

By the 6th post-burn day the child appeared extremely ill and comatose, his eyes were sunken, and the pulse was feeble and rapid (160/min.). There was fever (103° F.; 39.4° C.) and the respiratory rate varied from 44 to 48/min. His condition gradually deteriorated through the night, and he died at 6.30 a.m. on August 30, shortly after passing a large melaena stool.

**Necropsy Findings.**—There was an ulcer in the fundus of the stomach along the greater curvature, about 2.5 cm. in diameter extending to both surfaces and involving the mucous and submucous coats; the surrounding area was stained with bile. The second part of the duodenum was deeply congested but not ulcerated and there was congestion also of the jejunum and terminal ileum. Massive collapse was present in the right lung together with a small area of collapse in the left lung. There was papillary necrosis in both kidneys. The adrenals were hypertrophied but otherwise normal.

### Discussion

Gastro-intestinal ulceration is not commonly encountered in patients with burns, yet it occurs with sufficient frequency to indicate that there is a significant association. It is difficult to diagnose the lesion unless some type of catastrophe such as massive bleeding occurs, as often there are no signs or symptoms related to the ulcer. Harkins (1938) in his extensive review of the literature suggested that the frequency of this lesion is 3.8%.

In this hospital 2,165 children have been admitted with burns and scalds in the eight years (1954–61) since the opening of the unit, with 68 deaths, and a diagnosis of Curling's ulcer has so far been made only in the two instances reported above. Weigel, Artz, and Reiss (1953) found that the usual time of haemorrhage was on the 8th to 10th day after the burn, or earlier, while perforation was most frequent at about the 30th day. The course of events in the two cases described here is in accord with these statements.

While the ulcer is most probably solitary and duodenal in location, the stomach has been involved in an appreciable number of instances, either alone or associated with a separate duodenal lesion. Ulceration elsewhere in the gastro-intestinal tract appears to be rare.

Numerous theories have been propounded in an attempt to explain the ulceration. Among these, haemo-concentration and sepsis have been incriminated as important causative factors. However, it must be admitted that despite much speculation the aetiology of Curling's ulcers remains obscure.

### Summary

Two cases of Curling's ulcer are reported. In Case 1 a girl of 12 years with 40% burns started to bleed per rectum on the 40th day after burning and died on the 45th day. At necropsy an ulcer was found in the second part of the duodenum, with perforation and peritonitis. There was necrosis of the adjacent viscera, and a collection of pus was present in the lesser sac of the peritoneum.

In Case 2 a boy aged 2 years with 50% burns started having melaena stools on the third day after burning and died on the seventh day. At necropsy there was a large ulcer in the fundus of the stomach along the greater curvature, with bile-staining of the surrounding area.

I am indebted to Mr. A. McDowall and Mr. F. Robinson, consultants in charge of the unit, for giving me permission to publish these cases; also to Dr. L. White, consultant pathologist of the hospital, for the post-mortem reports and for personally helping me in preparing this paper.

### REFERENCES

- Cooper, S. (1839). *Lond. med. Gaz.*, 23, 837.  
Curling, T. B. (1842). *Med.-chir. Trans.*, 25, 260.  
Dupuytren, G. (1832). *Leçons orales de clinique chirurgicale*, I, 413. Baillière, Paris.  
Harkins, H. N. (1938). *Surgery*, 3, 608.  
Long, J. (1840). *Lond. med. Gaz.*, 25, 743.  
Swan, J. (1823). *Edinb. med. surg. J.*, 19, 344.  
Weigel, A. E. and others (1953). *Surgery*, 34, 826.

World food supplies must be doubled by 1980 and trebled by the end of the twentieth century if there is to be a "moderate improvement" in the levels of nutrition of the peoples of the world, the Food and Agriculture Organization says in a recently published booklet, *Six Billions to Feed*. It points out that an estimated 300 million to 500 million people do not have enough to eat, and that one-third to one-half of its present population of 3,000 million suffers from either hunger or malnutrition. By the year 2000, according to the medium forecast of population growth prepared by the United Nations, world population will have exceeded 6,000 million. The booklet is a non-technical presentation of a paper delivered in 1961 by Dr. P. V. Sukhatme, director of F.A.O.'s Statistics Division, to the Royal Statistical Society, London. (*World Food Problems*, No. 4. Available from H.M.S.O., price 2s. 6d.)