THE USE OF HYDROCORTISONE IN CRITICALLY ILL PATIENTS WITH PERITONITIS

W. B. ASHBY, Ch.M. (Liverp.), F.R.C.S., F.R.C.S.E.

Senior Surgical Registrar, United Liverpool Hospitals.

It is common practice to resort to the parental administration of steroids as a last desperate measure in the treatment of shocked patients who have failed to respond to appropriate conventional therapy. There is, however, a reluctance to use steroids when the shock is due to a septic process, and it is perhaps for this reason that there is a dearth in the British literature of reports of their use in peritonitis.

The purpose of this paper is to draw attention to the benefits and dangers of steroid therapy in peritonitis. A plea is made that hydrocortisone should be given as a short course early in the management of critically ill patients with peritonitis. In this text critically ill is used in the sense "likely to die".

The first case history is of an apparently moribund woman of 82 with generalised peritonitis whose general condition deteriorated in spite of conventional measures. A single intravenous injection of 200 mg. hydrocortisone was followed by sufficient improvement in her general condition for laparotomy to be undertaken on the following day when a gangrenous appendix was excised successfully. This happy and unexpected result led to the more confident use of steroids in other patients in poor condition due to peritonitis.

The summarised case histories of five critically ill patients with peritonitis are recorded and the use of steroids in these circumstances discussed.

Case Reports

Case No. 1. Mrs. C. G. aged 82 was admitted 16.6.62 to the Liverpool Royal Infirmary with a history of three days abdominal pain, vomiting and constipation. The patient was incoherent and was obviously very ill. She was fat and breathless, with auricular fibrillation and oedema of the ankles. She was pale and sweating and had a cracked dry tongue. Pulse rate at the wrist was 100/min. and the systolic blood pressure 110 mm.Hg; the diastolic pressure could not be recorded. There was abdominal distension, generalised tenderness and guarding, more marked on the right side. A diagnosis of peritonitis was made but the patient was too ill for exploration. Hb 108%, WBC 21,000/cu. mm. The stomach was kept empty by means of a Ryle's tube, fluid and electrolyte requirements maintained intravenously and two pints of blood given. Tetracycline, 500 mg. six-hourly, was given in the drip and the patient digitalised. After seven hours the blood pressure had fallen to 80/0 mm.Hg. and Cheyne-Stokes respiration was noted. At this stage hydrocortisone 200 mg., was administered intravenously. Within an hour the blood pressure had risen to 125/70 mm.Hg. Ten hours later laparotomy under general anaesthesia revealed a gangrenous perforated appendix with generalised peritonitis. Appendicectomy was performed with toilet of the peritoneal cavity and the abdomen closed with drainage of the wound and peritoneal cavity. Post-operatively the blood urea rose to 150 mg./100 ml. on the fourth ray, oedema of the lower limbs increased, presacral oedema became apparent and diuretics were prescribed. Convalescence was complicated by the severe diarrhoea of a staphylococcal entero-colitis which was treated with erythromycin. Wound dehiscence occurred but the patient was finally discharged home after eight weeks stay in hospital.

Case No. 2. Miss G. A. L., aged 17, was admitted to the Liverpool Royal Infirmary on 29.11.61 with fulminating ulcerative colitis. The disease had started three months previously and there had been one month's remission before the exacerbation requiring her admission. She was treated by general measures and by prednisolone, 5 mg. six-hourly, for five weeks without improvement. Steroids were then discontinued for two weeks while the patient was prepared for colectomy and ileo-rectal anastomosis. Cortisone was given to cover the operation. After the operation there was improvement for a few days until the onset of vomiting, abdominal distension and diarrhoea. Incontinence of faeces and urine added to the difficulty in assessing fluid and electrolyte losses for replacement. Cortisone was continued intramuscularly in doses of 50 mg. b.d. and courses of streptomycin and penicillin, tetracycline and chloramphenicol given. The blood pressure fluctuated and at one time fell to 55/0 mm. of mercury on the eighth post-operative day. Supportive therapy included gastric aspiration and the use of a great vein catheter by which 20% levulose was given in addition to saline, Darrow's solution and blood. By the twelfth post-operative day there were signs of a right subphrenic abscess and its drainage led to the development of an intestinal fistula. Steroid therapy was increased to hydrocortisone 100 mg. b.d. followed by cortisone 100 mg. b.d. Bowel sounds became normal, the general condition improved and by the fifteenth day the patient was able to take food by mouth. A second exploration, performed on the twenty-first post-operative day, confirmed the presence of an intestinal fistula and a large right subphrenic abscess which was drained. There was again temporary improvement

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followed by relapse with the onset of bronchopneumonia requiring bronchoscopy for collapse of the left lower lobe. The patient died five weeks after operation and autopsy confirmed purulent peritonitis and bilateral bronchopneumonia.

Case No. 3. Mr. J. W. L., aged 68 years, was admitted on 12.8.63 to the Liverpool Stanley Hospital. He had generalised abdominal pain of sudden onset fifteen hours previously and had vomited about a pint of “black blood”. There was a history of many years dyspepsia. He admitted having taken aspirin for his pain and this was subsequently considered the likely explanation for his haematemesis. Examination revealed a distressed and ill-looking patient with a silent tender abdomen and generalised guarding, pulse 80/min., blood pressure 100/60 mm.Hg. and haemoglobin 98% (14.4 gm./100 ml.) WBC 5,000/cu. mm. Laparotomy was undertaken two hours after admission through a right paramedian incision. A gangrenous perforated appendix was excised and more than a pint of sero-purulent peritoneal exudate aspirated. Neomycin, polymixin B. and bacitracin powder was sprayed into the peritoneal cavity and wound after lavage of the peritoneal cavity with isotonic saline. On completion of the operation the patient was given 100 mg hydrocortisone intravenously with a further 100 mg. i.m. the following morning and 50 mg. the following evening. On the day following operation the apparent improvement in general condition was remarkable—the patient was alert and on the second post-operative day peristalsis had returned sufficiently to start oral feeding. A five-day course of tetracycline was followed by a five-day course of chloramphenicol. Blood transfusion was given to correct the fall in haemoglobin that occurred as the blood volume was restored.

Case No. 4. Mr. S. G., aged 57, was admitted to the Liverpool Stanley Hospital on 25.8.63 with a 24-hour history of severe upper abdominal pain and vomiting. He had been off work for five years with severe chronic bronchitis and emphysema. He was a very sick man, cyanosed and dyspnoeic at rest, with clubbing of the fingers and toes and a fixed chest. There were signs of bronchitis and emphysema with severe bronchospasm. The abdomen was rigid and silent. Straight X-ray films of the abdomen revealed free gas under the left dome of the diaphragm. Under general anaesthesia a small upper right paramedian incision revealed thin purulent fluid particularly abundant in the hepatorenal space. A thickened appendix was palpated. A right gridiron incision was made and a perforated acutely inflamed appendix excised. Free faecoliths were removed from the peritoneal cavity which was irrigated with saline and sprayed with Neomycin, polymixin B. and bacitracin powder. Hydrocortisone was administered on account of the critical condition and the severe bronchospasm. 100 mg hydrocortisone was given intramuscularly on completion of the operation and 50 mg. morning and 25 mg. in the evening on the second post-operative day. Tetracycline was given intravenously in the drip until it could be given by mouth on the second day. On the morning after the operation the patient’s condition was considerably improved and the improvement continued until his discharge after 16 days in hospital.

Case No. 5. Mrs. M. E. W., aged 61, was admitted to the Liverpool Stanley Hospital on 24.9.63. She gave a history of sudden onset of severe central abdominal pain radiating to the back 13 hours previously. The patient was sullen and denied any previous history of dyspepsia. The pulse rate was 100/min. and blood pressure 170/100 mm.Hg. The tongue was dry and the abdomen distended, with generalised tenderness and guarding in the upper quadrant. There was no true rigidity. The patient was a heavy smoker and had chronic bronchitis and emphysema. Straight X-ray of the abdomen showed gas under the left dome of the diaphragm. Hb 76% (11.1 g./100 ml.). At laparotomy two pints of thin purulent fluid was evacuated from the peritoneal cavity and a one-inch diameter chronic benign perforated ulcer on the lesser curvature of the stomach excised. The defect in the stomach was repaired in two layers and the abdomen closed after spraying in a powder mixture of Neomycin, polymixin B. and bacitracin. Hydrocortisone was prescribed because of previous favourable experience with its use in seriously ill patients with peritonitis. 100 mg. hydrocortisone was given intravenously on completion of the operation, 50 mg. intramuscularly at six-hours, 12-hours and 24-hours and a final injection of 25 mg. 36-hours post-operatively. Tetracycline was administered in the intravenous drip for two days and subsequently intramuscularly for four days. Two pints of blood were transfused intravenously. The day following operation the patient admitted a long history of dyspepsia which she had concealed on admission. The wound healed by first intention but mild pyrexia delayed discharge from hospital until the 21st post-operative day. We suspected that a left subphrenic abscess had resolved spontaneously.

Discussion

It is well known that patients with Addison’s disease or adrenal atrophy resulting from previous steroid therapy require supplementary steroid therapy to avoid the risk of collapse after stress. Moore, Steenburg, Ball, Wilson and Myrden (1955) have demonstrated an increased urinary excretion of 17-hydroxycorticoids as part of the metabolic response to operation or infection. The purpose of this adrenal corticoid response to stress is at present unknown. It is a matter for speculation whether the maximum response from normal healthy adrenal glands is sufficient to meet the demands of extreme stress.

In this series hydrocortisone was given to five critically ill patients with peritonitis. Experience in the management of these patients supports the views of Jahn and colleagues (1954) and Henegar, Hunnicut and Kinsell (1956) that the administration of steroids in these circumstances may be life saving. Apparent improvement in the general status and local signs may mask advancing infection and operation must be performed at the earliest opportunity. An effective course of an appropriate antibiotic is considered essential.
Steroids have also been used as an adjuvant to other measures in the treatment of non-surgical infections. Wasz-Höckert (1962) reports a reduction in the mortality of severe tuberculous meningitis following the use of prednisone. Jahn and colleagues (1954) reported ACTH and cortisone, given as a four or seven-day regime, beneficial in the treatment of overwhelmingly severe infections in 42 medical patients. They consider the regime to be indicated in all patients with meningococcal meningitis. Hansted, Paerregaard and Thamdrup (1963) concluded that hydrocortisone benefited seven of 70 children with life-threatening infections but regrettably the outcome was not influenced in six. Hydrocortisone did not appear to affect the mortality or complications in patients with pneumococcal pneumonia treated with penicillin (Wagner, Bennett, Lasagna, Cluff, Rosenthal and Mirick, 1956) but a more rapid defervescence and improvement in symptoms was noticed in the hydrocortisone treated patients.

Animal experimental evidence suggests that cortisone will protect animals against the effects of endotoxins if given early enough but is not effective against exotoxins (Greenberg and Morgan, 1961).

Summary

Hydrocortisone and/or cortisone was given to five patients gravely ill with generalised peritonitis. In one patient the use of steroids at the time of operation was dictated by previous steroid therapy for ulcerative colitis and in the other four as an adjuvant to conventional therapy. It appears that as a result of steroid therapy there is a striking symptomatic and objective clinical improvement which is valuable in a critically ill patient but may mask advancing peritonitis. We reserve steroid therapy for the immediate operative period for critically ill patients with peritonitis and always combine the use of steroids with operation and an adequate antibiotic regime.

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W. B. Ashby

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