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Cardiac arrest following an intravenous urogram – a case report

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"HOW SAFE is an intravenous urogram examination?" This is a question often asked by the patient undergoing this examination and less so by the doctor requesting the examination. It is a pertinent question as a foreign agent is introduced into the patient's body for a period of time and reactions in various degrees of severity can occur. The following case report and a short review of the recent literature in the discussion hopefully will provide a satisfactory answer to the above question.

Case Report

W. W., a 43-year-old, obese woman was admitted to the University Hospital on 10/6/77 with the chief complaint of abdominal pain for 6 months. The pain was localised in the epigastrium, "cutting" in nature and was not related to food or posture. The pain came on and off and was associated with vomiting occasionally. A barium meal done showed a duodenal ulcer for which she was treated with magnesium trisilicate 15 mg six times a day and probantine 15 mg qid. The patient had some emotional problems and had been depressed. A psychiatric examination showed much of the patient's symptoms had an emotional overlay. She was prescribed valium 5 mg tds and mogadon 20 mg nocte. The patient is also diabetic. She was stabilised on diabenase 500 mg daily, metformin 500 mg qid, and diet control. No history of bronchial asthma or any other form of allergy was present.

The following relevant investigations were done:- Hb. 12.5 gm %, Wbc 7,200, urine FEME – nad, blood urea – 48 mg %. Oral cholecystogram showed no abnormality. Plain abdominal film showed a doubtful density at the level of the first segment of the coccyx. A urogram was requested as the abdominal pain persisted.

Intravenous Urogram done on 26/4/77

50 ml. of contrast media was given intravenously within a minute. There was no complaint during the injection However, 2 minutes after the injection, she complained of a generalised tingling sensation No rash was visible. She became restless and sweaty. At the same time, her radial pulse faded and she developed periphery cyanosis. Respiration was noted to have stopped. Cardiac arrest was established.

Immediate resuscitation was instituted. The patient was intubated and external cardiac massage applied. 200 ml. of sodium bicarbonate (8.4 meq./l) was given intravenously, together with isoprel 0.8 mg/500 ml at 20 dpm. The patient was resuscitated and extubation was carried out after 20 minutes. The intravenous urogram was cancelled.

A chest x-ray did not reveal any rib fracture or lung changes. The ECG done after the resuscitation was within normal limits. Further management of the patient was taken over by the ward staff. In the ward, she was maintained with isoprel and intravenous hydrocortisone and recovered fully.

Discussion

The above patient who developed a cardiac arrest following a urogram examination is the first case of this nature in the Department of Radiology, University Hospital. An average of 25 intravenous urograms per week are carried out in the depart-

ment. Intravenous urograms probably still remain the commonest procedure to give rise to complications in the X-ray Department. Ansell (1968) who conducted a national survey of radiological complication reported that severe reactions during intravenous urography was estimated to be in the region of 0.02%. 4 deaths were reported and the main feature of these cases appear to be hypotensive collapse with cardiac arrest. Patients with known history of allergy is a relatively high risk group. Shehadi (1975) recorded 11 deaths, 6 of which followed intravenous urogram. He noted that the incidence of reactions in patients who were not pretested and in patients with negative results to pretesting was the same as that of the general population. There were even 2 deaths following pretesting. In addition, there were 5 other patients in whom the reaction to the pretest dose was sufficiently severe that the scheduled examination was cancelled. Again, rapid injection rate in urography is accompanied by fewer reactions than a slow injection rate. The reverse is true for intravenous cholangiography.

The higher incidence of fatalities beyond the age of 50 is suggested to be due to the greater myocardial sensitivity in this age group but autopsy analysis of contrast media death has often been nonspecific. A commonly accepted explanation for contrast media reactions does not exist. Protein binding, histamine release, allergy, iodism, inhibition of cholinesterase and chemotoxicity along with idiosyncrasy have been the mechanisms discussed to explain the unusual responses to contrast media.

Lalli (1973) noted that reaction can occur without apparent relationship to previous exposure to the same or other contrast media. A given individual may have no reaction today and yet experience one next week and vice versa. Hence, history of reaction to previous examination is not an absolute contra indication to re-examination. Moreover, premedication had no significant effect in decreasing the overall incidence of adverse reactions.

Conclusion

An attempt is made to give a satisfactory answer to the degree of safety for patients undergoing intravenous urogram examination. Fatal or near-fatal reactions are rare but do occur. The patient presented had no past history of bronchial asthma or other allergy and it would not be possible to have prevented the near-fatal contrast reaction. No pretesting was done as its value is doubtful. Ansell & Ansell (1964) and Barnhard & Barnhard (1968) agreed that the most hopeful means of lowering the death rate is to ensure that resuscitative drugs and equipment are available and that all staff understand their use. Finally, it will not be overemphasising the point that all contrast media examination requests must be carefully considered as to their indications and value in the overall management and prognosis of the patients.

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