Intoxication with Medigoxin, Verapamil, Insulin, Benzodiazepines and Diuretics Simultaneously.

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Recently we treated a patient who had attempted to commit suicide by taking a large amount of drugs although not suffering from any of the illness usually treated with these medicaments. The course was further complicated by cardiac arrhythmia and acute renal failure.

CASE REPORT

The patient born in 1920, was transferred to the Intensive Care Unit because of cardiac arrhythmia and acute renal failure. The patient had attempted suicide in 1961 and 1962. He consumes a large amount of cognac a day.

Present state: at 8 a.m. on the 2nd September 1982 following a conflict in the family the patient injected himself with 200 u. Lente insulin in both thighs and took 4.0 mg medigoxin (40 tablets), 800 mg verapamil (20 tablets), 1500 mg triamterene and 750 mg hydrochlorothiazide (30 tablets), 75 mg diazepam (15 tablets), 250 mg medazepam (50 capsules) and 75 mg butamirate (15 tablets). He was admitted to hospital on the 3rd September at 0.40 a.m. in a hypoglycemic coma with blood glucose level of 0.5 mmol/L, and following application of glucose i.v. he regained consiousness during the morning. Status after treatment with glucose: well oriented, eupneic, with facial teleangiectasia. Pupils: slightly slower reaction to light. Lungs: harsh respiratory murmours, bronchial wheezing. Heart: finding normal. RR 100/70 mm Hg (13.3/9.3 kPa). Signs of dehydration. Liver 6 cm. Spleen not palpable. Digitorectal: finding normal. LABORATORY: Leukocytes 13.300 (non-segmented 5-15%) to 10.700. Urine: protein opalescent. 10-15 erythrocytes, plenty of bacteria, culture: ps. aeruginosa 10^7, gentamycin +++. Sodium in urine 117 mmol/L, the urine-serum creatinine ratio 10.3, osmolality in urine:245 mOsm/kg, the urine/serum osmolality ratio 0.9, index of

renal damage 11.7 (sodium in urine/the urine-serum ratio) show parenchymal renal acute failure (1). Creatinine clearance (Sept. 14): 28,8 ml/min. Blood glucose level: 11.0—4.8 mmol/L. Potassium in serum:6.4—6.3—5.3—4.5. mmol/L. Acid-base status: decompensated metabolic acidosis, later finding normal. RR in controls: 140/80 mm Hg to 170/90 mm Hg (18.7/10.7 to 22.7/12.0 kPa). Central venous pressure O cm H_2O to 10 cm H_2O. ECG changes are shown on Fig. 1. and Fig. 2. Later (9.3 at 2 p.m.): sinus rhythm of frequency of 46-72/min., left axis deviation, left bundle branch block, which remained constant during hospitalization. The corrected Q-T interval was 0.57 to 0.45 sec. Serum digoxin concentration was 11.7—2. 6—0.7 nmol/L (Figure 3.) The digoxin half-life was determined from the beta phase of the curve when the distribution of digoxin was in a steady state and after the beginning of the elimination processes by the formula (2):

$$C = C_O e^{-Ke}; \quad Ke = \frac{\ln C_1 - \ln C_2}{t_1 - t_2} \quad \text{and dig-}$$

$$\text{oxin } t\,1/2 = \frac{0.693}{Ke}$$

(C = concentration at the time, C_O = concentration at the time 0, C_1 = concentration at the time 1, C_2 = concentration at the time 2, Ke = elimination constante, ln = natural logarithm, e = the base of the natural logarithm).

During the slowed ventricular rhythm in a total atrioventricular block the patient had received 0.5 mg atropine i.v. several times, and also during sinus bradycardia. On the first day the daily urine amount was 200 ml, followed by 450-800-3100-4300-1600 ml. The urine catheter through urethra and been introduced on 9.3, removed on 9.5. During the first three days the patient was treated with 300 mg of furosemide i.v. The urinary infection was treated with gentamycin in a modified doses and alkalinization of the urine. Psychiatric state: endogenic depression-Psychosis type. Treatment: maprotiline, proma-

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zine.

DISCUSSION

Apart from hypoglycemic coma, the condition was complicated by cardiac arrhythmias and acute renal failure which began probably as the functional type and later developed renal type, complicated by urinary infection and by effect of benzodiazepines and diuretic hypotension including the hypotensive effect of verapamil. The cardiac arrhythmia disappeared on the second day. The serum digoxin concentration was high and half-life about 30 per cent prolonged. The patient did not have the corrected Q-T interval abbreviated (3) and ·cted

$$\text{corrected Q-T} = \frac{\text{measured Q-T in sec.}}{\text{R-R interval in sec.}},$$

without subjective symptoms of the digitalis toxicity. The P-T-Q index (4) could not be determined (P-T-Q = P-R interval in sec.

$$x - \frac{\text{negative T in mm}}{\text{corrected Q-T}}) \text{ because of atrial}$$

tachycardia and later due to complete left bundle branch block in which secondary T wave changes occured. It has been reported (5) that simultaneously ingestion of digoxin and verapamil significantly increases the serum digoxin concentration. Verapamil probably played the role in the appearance of total atrioventricular block. Probably the effects of triamterene and verapamil were also protective: verapamil by diminuting a toxic digitalis effects (6) and triamterene by augmenting the potassium intracellular concentration (7). Triameterene could also augment the serum digoxin concentration by blocking the renal tubular excretion of digoxin. Hyperkalemia probably appeared because of acute renal failure, because of a large dose of digitalis due to inhibition of Na, K, ATP-ase and because of the effect of triamterene.
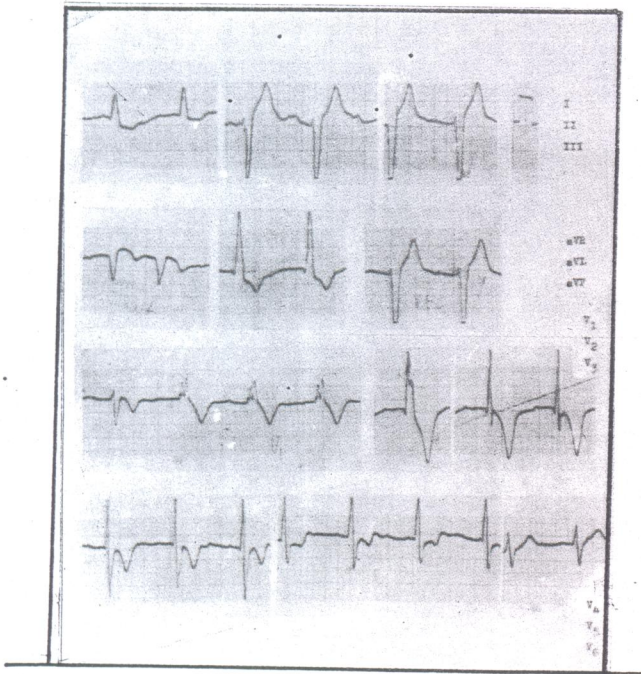

FIGURE -- 1.

ECG 17 hours after taking tablets: left axis deviation, atrial tachycardia 180/min., total atrioventricular block, quickened idioventricular rhythm 54/min. Corrected Q-T interval=1.0.57 sec. Serum digoxin concentration=11.7 nmol/L. Potassium in serum = 6.4 nmol/L.
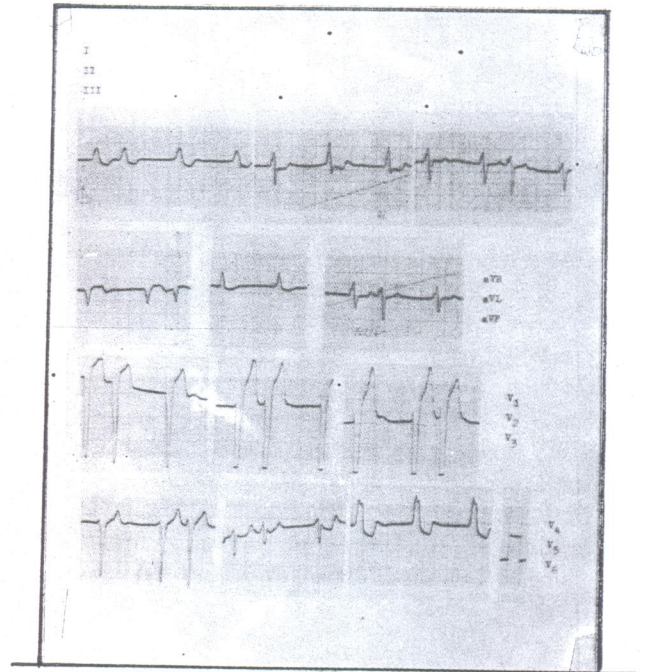

FIGURE — 2.

ECG 24 hours after taking tablets: left axis deviation, atrial fibrillation with ventricular arrhythmia of frequency of 80/min., left bundle branch block, intermittent total atrioventricular block with quickened ventricular Corrected Q-T interval = 0.45 sec.

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