(glycosuria 1%); $\frac{1}{4}$ hour, 157 mg. (1%); $1\frac{1}{2}$ hours, 273 mg. (2%); $2\frac{1}{2}$ hours, 220 mg. (5%). Insulin was then reduced to 5 units once daily, and the patient was discharged 44 days after admission.

Since then, good progress has been maintained and he has been supervised for more than three years. Soluble insulin therapy was changed to globin insulin (8 units once daily), with appropriate diet for a child aged 11 years, height 48 in. (122 cm.), and weight 56 lb. (25.4 kg.). There have been no relapses.

COMMENT

Joslin *et al.* (1946) reported a blood glucose concentration of 1,680 mg. per 100 ml. in a patient who recovered. The maximum recorded value in a patient who recovered appears to be 1,850 mg. per 100 ml. (Dillon and Dyer, 1935). A value of 2,060 mg. per 100 ml. was found by Lawrence (1934) in a patient two hours after 40 units of insulin had been given; this patient died.

Our patient, after receiving 660 units insulin and 320 g. glucose in 16 hours, attained a blood glucose concentration of 2,100 mg. per 100 ml.; this was at 2 a.m. Assuming that the "active volume of tissue fluid" was initially 0.5 that of the body weight, and allowing for the administration of nearly 3 litres of intravenous saline, calculations show that more than half the glucose administered had already been disposed of up to this time. In the next few hours, continued treatment rapidly restored the blood (and tissue fluid) glucose concentration to normal.

We wish to thank Miss E. Radovitch, formerly house-physician, for her co-operation, and Dr. H. L. Milles, under whose care the patient was admitted, for his help and encouragement in preparing this memorandum.

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REFERENCES

- Dillon, E. S., and Dyer, W. W. (1935). *Amer. J. med. Sci.*, **190**, 683.
Harrison, G. A. (1937a). *Chemical Methods in Clinical Medicine*, 2nd ed. p. 147. Churchill, London.
— (1937b). *Ibid.*, p. 197.
Joslin, E. P., Root, H. F., White, P., Marble, A., and Bailey, C. C. (1946). *The Treatment of Diabetes Mellitus*, 8th ed., pp. 169, 436. Kimpton, London.
Lawrence, R. D. (1934). *British Medical Journal*, **1**, 377.

Unusually High Blood Sugar in an Adult

The following case illustrates well that ketosis is the real enemy in diabetic coma, and that frequent blood-sugar estimations are essential.

CASE REPORT

A woman aged 67 was admitted to hospital unconscious on December 16, 1949, soon after midday. She was well known in the local diabetic clinic, being usually well stabilized. When seen in June, 1949, she was on a diet containing 150 g. of carbohydrate and having 26 units of soluble insulin, plus 8 units of protamine-zinc insulin each morning. She had failed to keep subsequent appointments, but her urine record up to December 14 showed mainly green tests. Her history included a perirenal abscess opened three years previously, and occasional attacks of urinary infection.

The patient had spent the previous day in Worthing, and had developed extreme frequency of micturition there. She came back that night, and knew no more until she woke up in hospital. She had almost certainly had no insulin on the 16th.

At 1.30 p.m. blood was taken, a fast-running normal saline intravenous drip was set up, and 50 units of soluble insulin were given intramuscularly. When I first saw her, at 1.45 p.m., she was deeply stuporous, but could appreciate stimuli. Her temperature was 97° F. (36.1° C.), pulse 80, and respirations 22. There was not a strong smell of acetone and the respiratory movements were not deep and mechanical. She was not flushed, but the eyeball tension was lowered.

At 4 p.m. it was reported that the blood sugar had been 2,000 mg. per 100 ml. at 1.30 p.m., so 100 more units of soluble insulin were given intramuscularly and 20 units intravenously. The pathologist, Dr. J. McMurray, checked this amazing figure on the same specimen of blood and made it 1,980 mg. At 6 p.m. the blood sugar was 1,020 mg. per 100 ml.

About 7 p.m. the intravenous drip stopped after she had had 1,500 ml. and had taken 16 oz. (454 ml.) by mouth. Owing to other emergencies, and the very difficult state of her veins, it was not started again until about 9.30 p.m. By this time she was conscious but still restless. On this occasion 4.3% glucose in N/5 saline was used. At 9.30 p.m. the blood sugar was 50 mg. per 100 ml.; this was reported by 10 p.m., and 4 ml. of 25% glucose solution was given into another vein (with great difficulty) and 30 g. of glucose by mouth. A further 30 g. of glucose was given at 11 p.m. by mouth.

From then on the patient made steady progress. A radiograph of her chest was normal, but a catheter specimen of urine grew a heavy growth of *Bact. coli*. It was rendered sterile after a course of "sulphatriad." She was discharged on January 10, 1950, on her usual 150-g. carbohydrate diet and insulin, 34 units soluble, plus 16 units P.-Z.

The recorded urine tests (catheter) during the critical period were as follows.

Urine Tests During Critical Period

Time	Benedict	Rothera	Gerhardt
16/12/49:			
12.30 p.m. ..	Red	+++	++
4 " ..	+++	+++	++
7 " ..	Orange	+++	+
9 " ..	Khaki	++	Nil
12 midnight ..	Dark green	++	"
1 a.m. ..	Green	+	"
3 " ..	Orange	Trace	"
5 " ..	"	Slight trace	"

COMMENT

This patient's good fortune lay in the comparatively slight degree of ketosis, which was apparent at once in her condition, and was borne out by the rapid disappearance of ketone bodies from the urine. This occurred in spite of the break in giving intravenous fluids. She responded very rapidly to insulin despite the very high blood sugar. This figure cannot be in doubt, as it was checked, and the 4-p.m. specimen was also high although she was responding excellently to treatment. One wonders if the unusual sensitivity to insulin at such a high blood sugar and the failure to attain the expected degree of ketosis were related.

I am indebted to Dr. E. J. Glynn for permission to describe this case, which he asked me to see, and to Dr. J. McMurray for the blood-sugar estimations.

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