

Kasuistik · Casuistry

Insulin in Post-mortem Blood

A Comment

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Recently, LINDQUIST and RAMMER (1975) reported on insulin concentrations in post-mortem blood in 29 cases of sudden death. Employing the Phadebas Insulin Test (Pharmacia, Uppsala, Sweden) they estimated the normal range of immunoreactive insulin in peripheral post-mortem serum. They recommend the radioimmunoassay of insulin as a diagnostic tool in cases of suspected fatal hypoglycemia as in accidental overdosage of insulin by a diabetic and in suicidal or homicidal injections of insulin. Most of the insulin suicides reported in literature have been committed by diabetic patients on insulin treatment (STOFER, 1970). I would like to point out that the simple direct radioimmunoassay of serum insulin does not reveal reliable results in diabetic subjects treated with insulin.

The basis of the classical radioimmunological assay is the ability of an antibody to specifically bind its antigen labelled with a radioactive isotope and the competitive inhibition of this reaction by the endogenous unlabelled antigen (YALOW and BERSON, 1960). In Phadebas Test an aliquot of the serum to be assayed for insulin is mixed with a calibrated amount of an immunosorbent consisting of insoluble polymer-coupled antibodies. After incubation the mixture is centrifuged, washed and the radioactivity of the solid phase is counted. The radioactivity of the centrifuged particles is inversely related to the quantity of immunoreactive insulin in the serum sample.

In 1956 BERSON *et al.* discovered the presence of specific insulin antibodies in serum of insulin treated subjects. The serum of these patients contains a mixture of unbound insulin, antibody-bound insulin and free antibodies. In radioimmunological insulin determination these free endogenous antibodies compete with the added exogenous antibodies for the radioactive tracer insulin and the radioactivity of the final solid phase remains too low. Therefore, the

endogenous antibodies must be removed from the diabetic serum before the radioimmunoassay is performed. This separation can be conveniently done by an acid ethanol extraction as described by HEDING (1972).

Thus in a forensic case of suspected fatal hyperinsulinism involving an insulin treated diabetic patient removal of endogenous insulin antibodies should always be performed prior to insulin radioimmunoassay.

REFERENCES

- BERSON, S.A., YALOW, R.S., BAUMAN, A., ROTHSCHILD, M.A., NEWERLY, K.: Insulin- I^{131} metabolism in human subjects: demonstration of insulin binding globulin in the circulation of insulin treated subjects. *J. clin. Invest.* 35, 170-190 (1956)
- HEDING, L.G.: Determination of total serum insulin (IRI) in insulin-treated diabetic patients. *Diabetologia* 8, 260-266 (1972)
- LINDQUIST, O., RAMMER, L.: Insulin in post-mortem blood. *Z. Rechtsmedizin* 75, 275-277 (1975)
- STOFER, A.R.: Suicid mit Insulin und Nachweis des Insulins an der Leiche. *Arch. Toxikol.* 26, 1-7 (1970)
- YALOW, R.S., BERSON, S.A.: Immunoassay of endogenous plasma insulin in man. *J. clin. Invest.* 39, 1157-1175 (1960)

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