Comparison of insulin tolerance test and ACTH stimulation test for evaluation of hypocortisolism in patients with acromegaly

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BACKGROUND

The insulin tolerance test (ITT) is considered the gold standard test for evaluating the ACTH-cortisol axis in patients with pituitary disease. However, the test requires time and personnel resources, and has clear contraindications. Therefore, an ACTH stimulation test (SynACTHen test) is often performed instead.

OBJECTIVE

To compare the peak cortisol response during ITT and ACTH stimulation test in patients with pituitary disease.

METHODS

In a total of eight patients with acromegaly, both ITT and an ACTH stimulation test were performed during the same week, but on separate days. A total of 20 comparisons were performed, 5 preoperative and 15 postoperative.

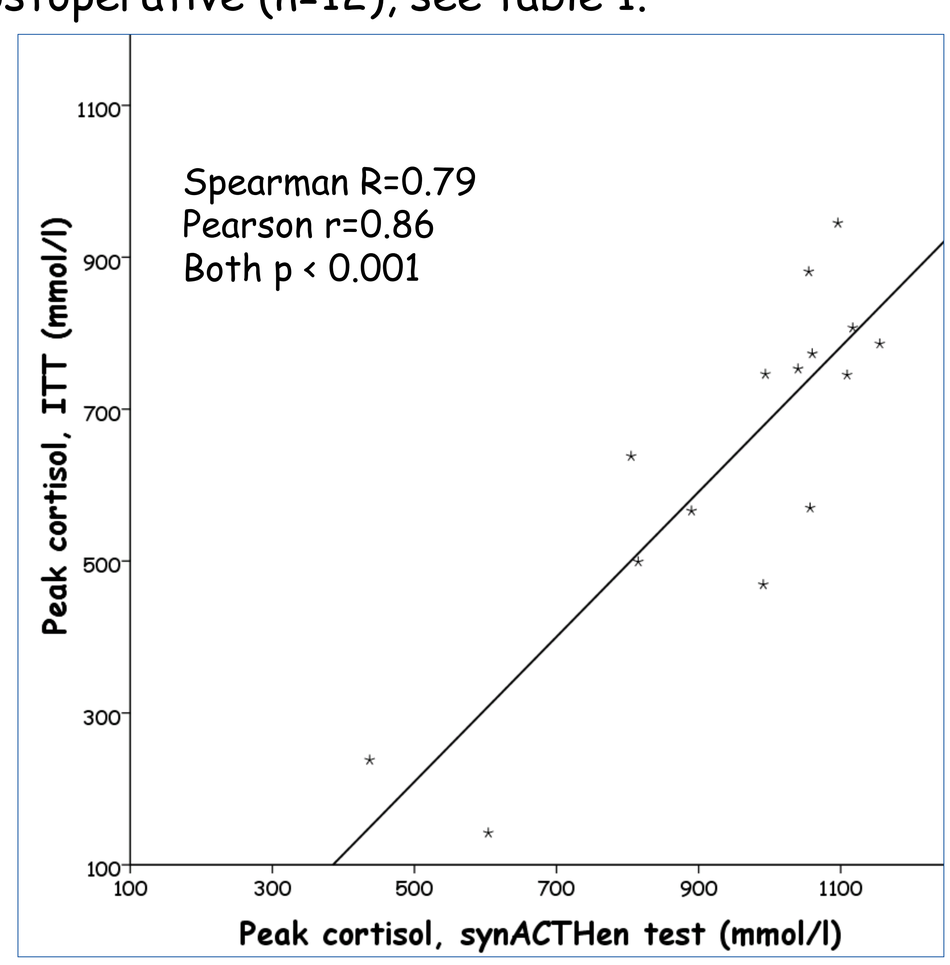
Table 1. Peak cortisol (nmol/l) for each test

Patient	Time of study	ITT	SynACTHen test
1	5 years postopr	566	890
2	5 years postopr	746	994
3	5 years postopr	238 *	437 *
4	3 months postopr	881	1055
	5 years postopr	945	1096
5	First evaluation	570	1057
	1 year postopr	753	1040
	5 years postopr	638	805
6	3 months postopr	499 *	815
	5 years postopr	469 *	991
7	After SMS analog	745	1109
	3 months postopr	807	1117
	1 year postopr	773	1060
8	First evaluation	142 *	604

* Peak cortisol < 550 nmol/l

RESULTS

Five comparisons were excluded for analyses due to inadequate hypoglycaemia. The remaining 15 comparisons were both preoperative (n=3) and postoperative (n=12), see table 1.



During ITT, peak cortisol level was 637/745 nmol/l (mean/median). Peak cortisol after ACTH stimulation was 948/1040 nmol/l. There was significant correlation between highest plasma cortisol during ITT and ACTH stimulation, se graph.

At ITT, four test displayed peak cortisol <550 nmol/l, of them only one ACTH stimulation test resulted in peak cortisol <550 nmol/l. The discrepant results were pre-treatment, 3 months and 5 years postoperative.

CONCLUSION

We demonstrate:

- **A discrepancy between cortisol response during ITT and ACTH stimulation test**
- **That ACTH stimulation test leads to a higher peak cortisol level and less often a blunted response when using the same cut-off level.**

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