

Query High Dose Hook effect on Estradiol

HOSP #		WARD	Andrology Clinic (IVF Clinic)
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Abnormal Result

Estrogen 4823 pmol/L in a patient with in vitro fertilization.

Presenting Complaint

The Doctor called, querying if this might be a possible high dose hook effect. They expected a much higher result with this particular patient.

I explained that this is a competitive immunoassay and that high dose hook effect is most likely observed rather with sandwich immunoassays.

History

This patient was undergoing IVF for multiple pregnancy – higher value anticipated (10000 – 12000 pmol/L)

Examination

N/A

Laboratory Investigations

1 in 10 dilution made, result of the rerun was $415 \times 10 = 4150$ pmol/L (-14% difference).

Other Investigations

Final Diagnosis

The estradiol was indeed likely close to a true result, even though queried by the clinician.

This was confirmed by the duplicate result when running this sample in dilution. The -14% difference from the original result can likely be explained by imprecision from:

- Pipetting error when doing the manual dilution
- Imprecision of the analyser
- Matrix effects when using the universal diluent from the analyser

Take Home Messages

Competitive immunoassays are NOT prone to high dose hook effect, due to the inherent characteristics of the assay.

It is however known that measurement of estradiol at the levels required for IVF is not in the linear range of the assay and that there are likely to be imprecision as noted by the points above.

The measuring range as quoted by the package insert for our Roche Cobas 6000 E2 assay is 18.4 – 11010 pmol/L (LOD to max of master curve). It can however be reported up to 110100 pmol/L for 10-fold diluted samples.

It is however a pity that the reading off the standard curve

(signal) cannot be seen on the analyzer's firmware, as can be seen with routine chemistry analytes eg. liver enzymes etc.

An interesting article which I've also forwarded to the doctor is added below.

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