

LABQUALITY DAYS

Interference in Oestradiol assays from Hormone Therapies used in Breast Cancer Treatment

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Introduction

Fulvestrant, an estrogen receptor antagonist, and Exemestane, an aromatase inhibitor, are two hormonal therapies used to treat estrogen receptor positive breast cancers. Most manufacturers of immunoassay methods for estradiol measurement state in the accompanying literature that Fulvestrant interferes with measurement of estradiol; some do also state that aromatase inhibitors may interfere. Most laboratories measuring estradiol do so by immunoassay, and in a general, adult hospital providing cancer care, laboratories are highly likely to analyze samples in patients on such hormonal cancer therapies.

Aims

To assess the extent to which Fulvestrant and Exemestane interfere with estradiol measurement by different manufacturers' methods, and how aware laboratories are of the limitations of their estradiol assays in patients on hormonal cancer therapies.

Methods

At Distribution 523 of the UK NEQAS for Steroid Hormones EQA scheme, there were 283 participants registered for estradiol. Three pools of off the clot serum from female donors were prepared – a base pool, the base pool with 25 ng/mL added Fulvestrant, and the base pool with 150 pg/mL added Exemestane (concentrations based on the steady state concentrations of both drugs quoted in the literature) – and distributed to participants in the UK NEQAS for Steroid Hormones EQA scheme at Distribution 523 (September 2024). Cross-reactivities of the results obtained from participants for different methods against the base pool measured by that method were calculated. In addition the participants were asked to answer a number of web Q&As relating to how they handle estradiol requests in this patient group.

Results

Cross-reactivities and difference in measured estradiol from the base concentration when 150 pg/mL Exemestane was present were negligible in all methods. When 25 ng/mL Fulvestrant was present, significant increases in measured estradiol concentration were observed. These were particularly large in the Siemens ADVIA Centaur and Siemens Atellica methods. Smaller but still significant cross-reactivity was observed in the Abbott Architect and Abbott Alinity methods. There was negligible or no cross-reactivity observed in all other immunoassay method groups (Beckman Access/Dxl, Roche Cobas, Roche Cobas Pro and QuidelOrtho), and in the Mass Spectrometry group. The Q&As received 158 responses (56% response rate). 85% of respondents analysed all estradiol requests received without vetting them on the basis of clinical details (including medications that the patient is taking). 27% of respondents referred estradiol requests for mass spectrometry analysis, either at the request of the clinician, or following review of clinical details. 59% of respondents did not append any comments to estradiol results regarding potential assay interference from certain medications including Fulvestrant.

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Conclusions

Fulvestrant interferes significantly with estradiol measurement in some estradiol immunoassays, which can lead to over-estimation of the actual estradiol concentration present in this patient group. Even though most manufacturers state that Fulvestrant interferes in measurement of estradiol by their immunoassays, it appears that a large proportion of laboratories have not acted on this information. This may potentially lead to inappropriate treatment decisions in patients on Fulvestrant, where estradiol concentration is monitored to evaluate menopausal status.

