INTRODUCTION

- Discrete measures of free radicals, antioxidant activity, and oxidative damage suggest an ambiguous relationship between the redox system and male fertility. Oxidation-reduction potential (ORP) measures the balance between all oxidants and antioxidants.
- In a previous study, ORP and semen analysis data were compared between two Andrology laboratories, in which ORP remained consistent in both individually as well as combined datasets.
- The objective was to investigate the reproducibility and reliability of the ORP measurement as a marker of sperm quality across different fertility centers.

EXPERIMENTAL DESIGN

- Prospective study was carried out jointly by nine participating fertility centers on 2092 subjects.
- Subjects were grouped into normal and abnormal semen parameters (concentration, total cell, total motility, progressive motility, and morphology) according to WHO 2010 guidelines.
- The ORP was measured using the MiOXSYS system and normalized to sperm concentration (mV/10^6 sperm/mL) (Fig. 1).
- ANOVA/ t-test measures were used to determine significant differences.

RESULTS

- Of the 2092 samples, 199 were found to have normal semen parameters and 1893 were found to have abnormal semen parameters.
- The mean ORP value (mV/10^6 sperm/mL) in the semen of the abnormal group was 5.08 mV/10^6 sperm/mL whereas that of the normal group was 0.88 mV/10^6 sperm/mL (p = 0.001) (Table 1).
- The area under curve for ORP was 0.757 with an overall detection of abnormal semen quality with a 98.1% sensitivity, 40.6% specificity, 94.7% positive predictive value, and 66.6% negative predictive value (Fig. 2)
- The ORP cut-off value (1.34 mV/10^6 sperm/mL) was able to differentiate specimens with abnormal semen parameters (Fig. 3).

CONCLUSION

- ORP levels can serve as an adjunct to routine semen analysis.
- ORP remains stable even with measurable differences in sperm parameters, and it therefore can be used as a supplementary test to semen analysis to confirm oxidative stress and poor semen quality.
- Abnormal ORP levels may be helpful in identifying the altered functional status of the sperm in patients with poor semen quality and thereby directing those men to appropriate therapeutic management.