QC in the andrology laboratory

Three phases of laboratory testing

•Pre-analytical phase

•Analysis

•Post-analytical phase

Internal quality control

•Intra-individual

•Inter-individual

External quality control

•Quality tests performed by an external body that makes comparisons between different laboratories for several procedures

External quality assurance programmes in Europe that control for the assessment of sperm concentration, sperm motility and sperm morphology:

•United Kingdom National External Quality Assessment Service (UK NEQAS),

•European Academy of Andrology (EAA),

•European Society of Human Reproduction (ESHRE)

Practical approach to quality control

Weekly:

•concentration:

- intraindividual assessment
- interindividual assessment
- accubeads - commercially available references of the standards

•motility:

- no standards
- comparison with the video-recorded specimens

•morphology:

- intraindividual and interindividual variation

•immunological and biochemical tests:

- positive and negative controls

Monthly:

•estimates of the mean results

Quarterly:

•external quality control

Annualy:

•calibration

- equipment
- pipette
- counting chamber

•checking

- incubator
- heating surfaces

Sources of variation (error) in assessing sperm concentration

- Incomplete mixing of semen samples before making dilution
- Dilution errors
- Pipetting device out of calibration
- Chamber incorrectly assembled or loaded
- Microscope not properly cleaned or aligned. Incorrect magnification
- Mathematical error in calculating, or correcting for dilution

Sources of variation (error) in assessing sperm morphology

- Inadequate training before performing analysis
- Poor staining technique (i.e. light, dark, or too much background staining)
- Poor smear preparation (i.e. too thick or too thin)
- Not scoring all spermatozoa in area but selecting spermatozoa for assessment
- Subjective techniques without clear guidelines

Sources of variation (error) in assessing sperm motility

- Improper mixing of specimen before aliquot is removed
- Waiting too long after slide is prepared before analysis (spermatozoa quickly lose vigour)
- Improper temperature of stage warmer (e.g. too high temperature will kill spermatozoa)
- Making the assessment too slowly (other spermatozoa swim into the defined area during the assessment period)
- Subjective bias (i.e. consistently too high % motile or too low % motile)
- Preparative procedures that reduce motility (e.g. temperature change, vigorous mixing, contamination with toxins)
- Non-random selection of fields for analysis. Delay in analysis (e.g. waiting until motile spermatozoa swim into the field or grid to begin analysis)

Sources of variation (error) in assessing sperm vitality

- Improper staining: some recipes give hypo-osmotic conditions that kill spermatozoa
- Waiting too long to stain
- Overestimation of dead spermatozoa (e.g. perceiving as dead sperm heads with slight pink stain)
- Microscope not properly cleaned or aligned. Improper magnification