Comparison Of Manual Vs Automated (SQA Vision) Semen Analysis: A Double Blind Prospective Study

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- **Manual semen analysis** suffers from **analytical variability** & **subjective variation**.
- Manual assessment of sperm morphology is associated with difficulties related to **lack of objectivity, variation in interpretation** or poor performance in external quality-control assessments.

- To **compare an automated computerized semen analysis system (SQA-Vision) to the conventional manual method** in terms of **accuracy and precision**.

- **Type of study: Prospective (Double blind), analytical**
- Conducted in **Division of Clinical Microbiology** and Molecular Medicine, Department of **Lab Medicine, AIIMS**, New Delhi between **July- September 2016**.
- **250 fresh semen samples were tested by both, manual method & SQA-Vision, in duplicate** at room temperature.
- **Manual testing** was done by **2 independent operators** & 1 manual operator ran **SQA-Vision immediately following the manual analysis** of motility to **prevent bias.**
- **Sperm concentration, total and progressive motility & morphology** were assessed according to the **5th WHO semen testing laboratory manual, 2010**.
- Statistical analysis of data was done using **MedCalc (Belgium) and Excel programs.**

- Comparison of the **SQA-Vision & manual results** is presented in the table 1 below**.**

Table 1: Comparison of SQA-Vision & manual results of semen analysis

Statistical Parameters		Semen Parameters: Sperm Conc.	Total Motile PR + NP	Progressive PR	Morph. Normal Forms
SQA-Vision	*Mean (x10⁶/ml)*	45.4	30.0	20.8	6.4
	CV, %	**3.1**	**5.6**	**4.4**	**5.3**
Manual	*Mean, x10⁶/ml*	46.3	35.0	24.5	7.7
	CV, %	**11.0**	**14.0**	**19.6**	**17.8**
Sensitivity (%)		**100.0**	**95.2**	**95.9**	**100.0**
Specificity (%)		99.3	89.6	85.0	98.9
Concordance Correlation		0.97	0.84	0.86	0.84
Pearson Correlation		**0.97**	**0.87**	**0.89**	**0.89**
Bias Correction (accuracy)		**1.0**	**0.96**	**0.97**	**0.95**

- CVs for SQA-Vision are much lower than for manual analysis which demonstrates that SQA-Vision's precision is higher.

Fig 1. Sperm Concentration

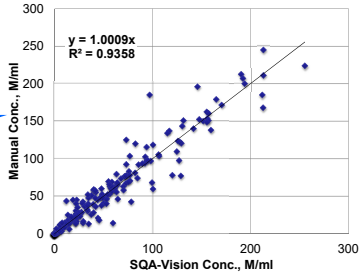


Fig 2. Sperm Total motility

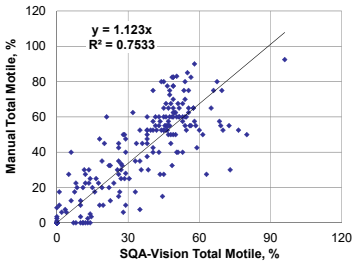


Fig 3. Progressive motility

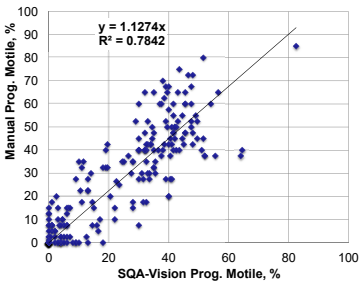
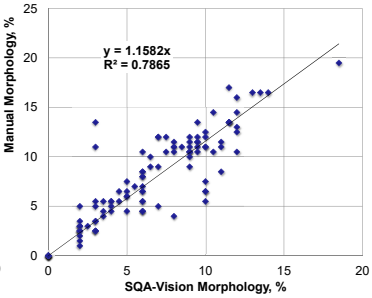


Fig 4. Sperm Normal Morphology



- **SQA-Vision & manual** semen parameters' **mean values are quite close** demonstrating **no systematic discrepancies.**
- **Sensitivity, specificity, concordance & correlation coefficients are very high** indicating a high level of **accuracy & close agreement** between the 2 methods.
- **Bias correction coefficients** are between **0.95 & 1.0** for different semen parameters showing a high level of agreement.

- The automated semen analyzer **SQA-Vision is faster** and provides a **higher level of standardization** and **precision vs. manual semen assessment**.
- The simplicity of operating the automated SQA-Vision **minimizes the need for highly skilled professionals**.

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