Is it time to switch to automated semen analysis?

A comparative double-blind study between 2 recent sperm analyzers and manual semen analysis

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Introduction

Despite the WHO efforts to standardize manual semen analysis, the technique still lacks reproducibility and accuracy. Several automated sperm analyzers have been developed and improved over the last 20years, based on various technological approaches, i.e. image analysis (CASA) or analysis of electro-optical signal. The main objectives of these systems were to improve lab's workflow, precision and accuracy of semen analysis via objective and high-throughput cell analysis.

Although most studies have reported modest or acceptable agreement between automated and manual semen analysis, but many andrology labs still remain reluctant to invest in this technology.

The aim of our study was to compare results given by automated semen analyzers (CASA and electro-optical systems) to manual analysis performed according to WHO 2010 guidelines.

Study design, patients and methods

This is a ***prospective, double-blinded***, mono-centric study which was conducted between February and May 2018.

Patients presenting at the andrology laboratory for a routine semen assessment were included in the study, provided sperm sample volume was > 2.5ml. Only patients with azoospermia were excluded.

Manual semen analysis, performed according to WHO 2010 guidelines, was used as gold standard and the results were compared with those obtained with 2 automated semen analyzers:

- ***Sperm Class Analyzer, SCA® (CASA, Microptics®)***
- ***Sperm Quality Analyzer-Vision, SQA Vision® (electro-optical, MES®)***

Both automated systems underwent daily quality control by using QC beads for low and high concentrations.

Results and Discussion

Mean patients' age was 35±7.6 years. Mean abstinence delay was 4.5±2 days. Both sperm analyzers had good repeatability (CV) regarding the 3 studied parameters **(Table 1).**

Mean sperm concentration, progressive and total motility were not statistically different between the 3 methods **(Table 1).**

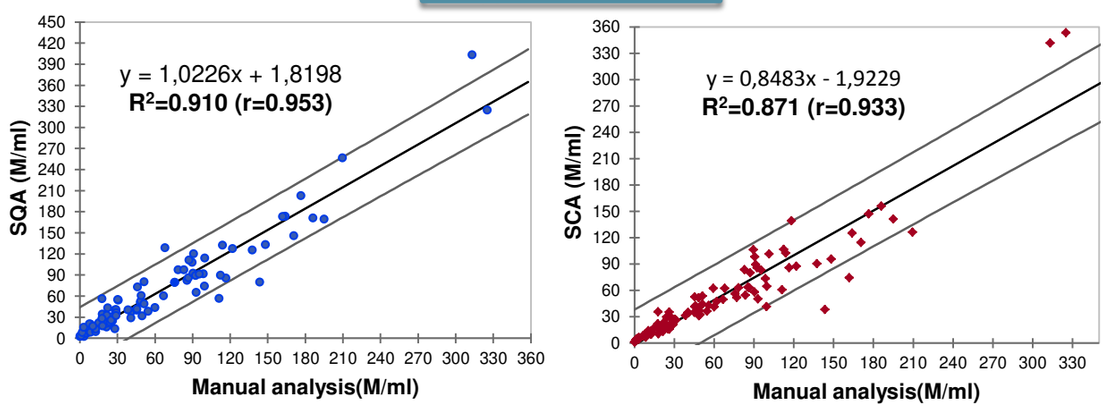
Mean proportion of typical forms was significantly higher with SQA® than with manual and SCA® **(Table 1).** However, very high specificity was found for the detection of teratozoospermia by the two automated systems **(Table 2).**

The correlation coefficient between automated and manual measures was excellent for sperm count, fair for sperm progressive motility and moderate for sperm morphology **(Figure 1).**

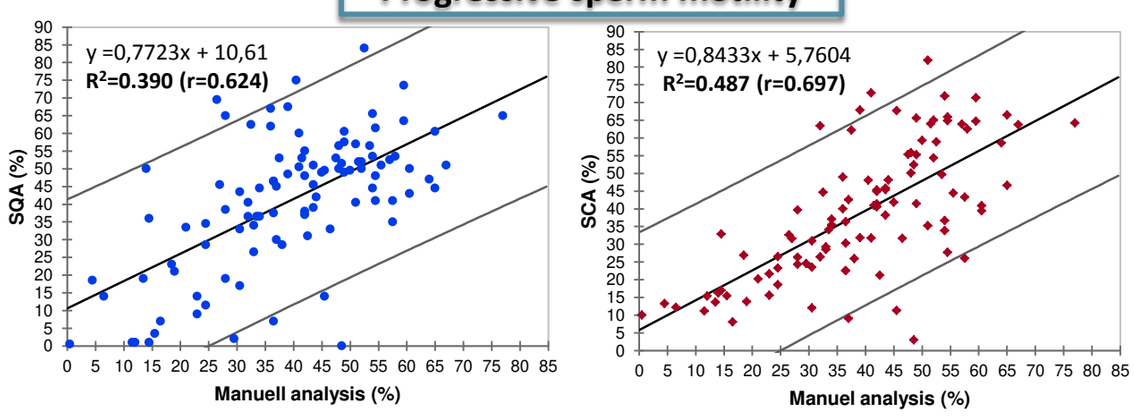
Out of the 102 samples analyzed, 16 (15%) had different overall interpretation of sperm analysis according to the method used, i.e. automated or manual.

In conclusion, both automated sperm analyzers appear to have acceptable analytical performance, and to be as reliable as manual assessment for sperm analysis, provided they are run by expert users and QC program is implemented.

Sperm count



Progressive sperm motility



Typical sperm forms

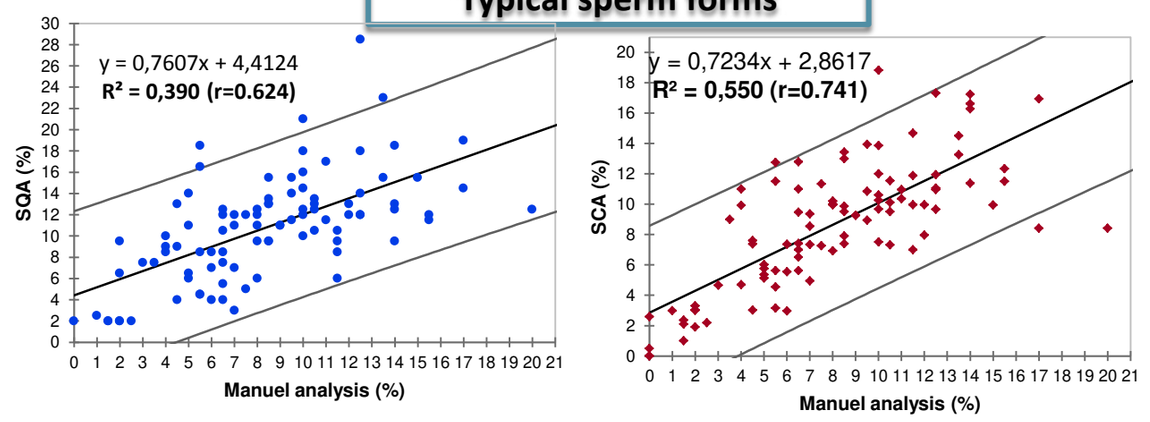


Figure 1: **Scatter plots**

	Manual analysis		SQA-Vision®		SCA®	
	Mean	CV (%)	Mean	CV (%)	Mean	CV (%)
Sperm count (M/ml)	64.8	**7**	68.1	**6**	53.1	**7.1**
Progressive motility (%)	39.7	**9.7**	41.3	**11.1**	39.2	**8.1**
Typical sperm forms (%)	8.1[a]	**16.8**	13.5[a,b]	**8.9**	8.6[b]	**13**

a, b: statistically significant differences

Table 1: **Comparison between means and coefficients of variation of the 3 methods**

		Specificty (%)
Sperm count	SQA-Vision®	98.8
	SCA®	97.6
Progressive motility	SQA-Vision®	90.5
	SCA®	78.4
Sperm morphology	SQA-Vision®	98.8
	SCA®	96.4
All sperm parametters	SQA-Vision®	93.6
	SCA®	80.3

Table 2: **Specificity for the detection of abnormal sperm parameters**

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