

CHALLENGING EAU GUIDELINES: PROPOSAL OF A NEW SPERM CONCENTRATION CUT-OFF FOR CFTR GENE TESTING IN INFERTILE MEN

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OBJECTIVES

- The 2019 EAU guidelines for male infertility suggest to perform CFTR gene screening during infertility work-up if semen volume is <1.5 ml.
- **We evaluated the sensibility, specificity and predictive accuracy (PA) of the current EAU guidelines' cut-off based on semen volume in comparison with a different cut-off based on sperm concentration values in order to more reliably identifying CFTR gene alteration(s) (i.e., mutations and polymorphisms) in a homogenous cohort of white-European men presenting for couple's infertility.**

MATERIALS & METHODS

- Complete data from **1037 primary infertile men were analyzed**. Semen parameters were assessed based on 2010 WHO reference criteria.
- EAU guidelines for CFTR gene alterations testing (semen volume <1.5 ml as for WHO criteria) were firstly adopted in our cohort; thus, **the predictive performance and accuracy of different sperm concentration cut-offs (5M/ml vs. 4M/ml vs. 3M/ml vs. 2M/ml vs. 1M/ml for CFTR deletion and 15M/ml vs. 10M/ml vs. 5M/ml vs. 4M/ml vs. 3M/ml vs. 2M/ml vs. 1M/ml for CFTR polymorphisms) were tested.**
- Youden's index calculation and AUC were used to identify the best cut-off for sperm concentration.

RESULTS

- Of 1037, 151 (14.5%) patients had semen volume <1.5 ml and would have deserved CFTR testing according to EAU guidelines
- Of 151, 4 (0.3%) actually displayed a CFTR mutation. Conversely, of 1037, 150 (14.5%) patients displayed a CFTR polymorphism.
- **Overall predictive accuracy (PA), sensibility, specificity, FPR and AUC of EAU guidelines were 86.8%, 50%, 86.9%, 13% and 68% for CFTR mutations and 77.6%, 22.6%, 86.9%, 13%, 54% for CFTR polymorphisms.**
- For CFTR mutations, lowering the sperm concentration cut-off of 1M/ml each step (5M/ml vs. 4M/ml vs. 3M/ml vs. 2M/ml vs. 1M/ml), the model performance was kept, compared to EAU guidelines. The Youden's index increased at decreasing sperm concentration, with its maximum in the case of sperm concentration <1M/ml.
- As for CFTR polymorphisms the model performance was comparable with the EAU guidelines. The Youden's index for CFTR polymorphisms was maximum in the case of sperm concentration <10M/ml.

Tables: Performance of the different tested model for **CFTR deletion (table1)** and **CFTR polymorphism (table2)** according to different sperm concentration cut-off values

Cutoff	Sensitivity (True positive)	1-Specificity (False positive)	Youden's index (TP-FP)	AUC
EAU Guidelines	50	13.02	36.97	68.48
<5 million/ml	75	51.07	23.92	61.96
<4 million/ml	75	47.56	27.43	63.71
<3 million/ml	75	44.73	30.26	65.13
<2 million/ml	75	40.54	34.45	67.22
<1 million/ml	75	35.33	39.66	69.83

Cutoff	Sensitivity (True positive TP)	1-Specificity (False positive FP)	Youden's index (TP-FP)	AUC
EAU Guidelines	22.66	13.02	9.64	54.82
<15 million/ml	70.66	66.70	3.96	51.98
<10 million/ml	64.66	60.36	4.30	52.15
<5 million/ml	54	51.07	2.92	51.46
<4 million/ml	51.33	47.56	3.76	51.88
<3 million/ml	48.66	44.73	3.93	51.96
<2 million/ml	43.33	40.54	2.78	51.39
<1 million/ml	35.33	35.34	0.01	49.99

CONCLUSIONS

Current EAU guidelines for CFTR mutations testing (<1.5ml) depicts an overall good performance in identifying both CFTR deletion and polymorphisms. However, given the greater prevalence of a reduced sperm concentration compared to a reduced semen volume in the everyday clinical practice, this newly-suggested cut-off appears to be more widely applicable while maintaining the same performance values.