The relation between upper limbs action tremor asymmetry, midline tremor and gait disorders in Essential Tremor: an exploratory study

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INTRODUCTION

Upper limbs action tremor represents the clinical hallmark of Essential Tremor (ET), which showed varying degrees of asymmetry. The possible role of the upper limbs action tremor asymmetry in the context of the broader ET motor phenotype has not been addressed to date.

OBJECTIVE

The aim of the present study was to assess the possible relation between upper limbs action tremor asymmetry and other motor aspects which may characterize the ET syndrome.

RESULTS

Thirty-seven tremor patients [8 pure ET (21.6%) and 29 ET-plus (78.4%)] were enrolled.

Forward outstretched (FO) postural tremor represented the action tremor subtype showing the greater clinical asymmetry across the whole tremor population. No significant differences on action tremor AIs were reported between pure ET and ET-Plus. Based on FO tremor AI, two patients' subgroups were defined: A-ET (N=21, 56.8%) and S-ET (N=16, 43.2%), the latter showing higher midline tremor severity (i.e. head and voice) and worse instrumental gait parameters.

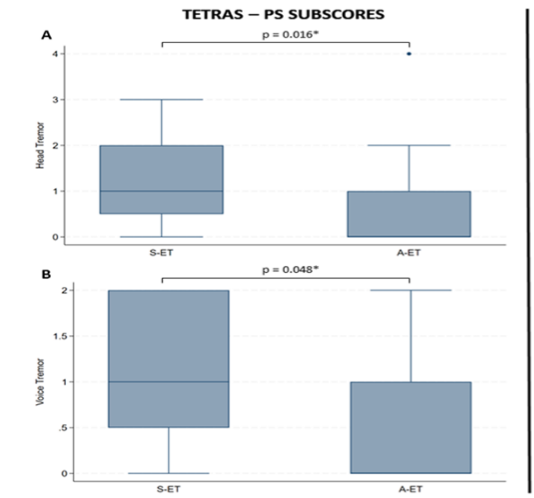
METHODS

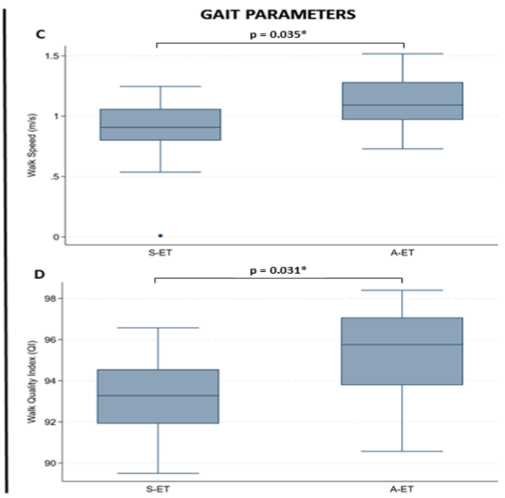
Clinical tremor scores and instrumental kinematic gait parameters were assessed. An asymmetry index (AI) was computed based on clinical severity of each upper limbs action tremor component.

$$AI = \left| \frac{\text{right arm tremor} - \text{left arm tremor}}{\text{right arm tremor} + \text{left arm tremor}} * 100 \right|$$

Symmetric (S-ET, AI=0) and Asymmetric (A-ET, AI>0) patients were defined and compared based on the most asymmetric action tremor component.

	ET N=37	S-ET N=16 (43.2%)	A-ET N=21 (56.8%)	p-value
Age	71.4 ± 6.5	72.1 ± 4.6	70.9 ± 7.7	0.518
Males (%)	26 (70.3)	11 (58.7)	15 (71.4)	0.860
ET Classification				
Pure ET (%)	8 (21.6)	4 (25.0)	4 (19.0)	0.663
ET-Plus (%)	29 (78.4)	12 (75.0)	17 (80.9)	0.663
Age at onset	47.2 ± 22.7	48.7 ± 22.0	45.9 ± 23.7	0.933
Disease duration (years)	24.3 ± 20.5	23.3 ± 20.4	25.0 ± 11.7	0.862
Tremor Medications (%)	13 (35.1)	5 (31.2)	8 (38.1)	0.666
Propranolol (%)	9 (69.2)	5 (100.0)	4 (50.0)	0.164
Topiramate (%)	3 (23.1)	0	3 (37.5)	0.164
Primidone (%)	1 (7.7)	0	1 (12.5)	0.164
TETRAS ADL	14.0 ± 11.2	15.3 ± 9.1	13.1 ± 12.7	0.366
TETRAS PS total	26.8 ± 10.2	30.0 ± 6.9	24.4 ± 11.7	**0.043***
Head	0.83 ± 1.00	1.19 ± 0.91	0.55 ± 1.00	**0.016***
Face	0.36 ± 0.59	0.37 ± 0.62	0.35 ± 0.59	1.000
Voice	0.77 ± 0.73	1.06 ± 0.77	0.53 ± 0.61	**0.048***
FO Tremor	2.7 ± 1.1	3.1 ± 0.9	2.4 ± 1.1	0.054**
FO - AI	29.2 ± 39.2	0	51.4 ± 39.5	**<0.001***
LW Tremor	2.9 ± 0.9	3.1 ± 0.9	2.8 ± 1.0	0.246
LW - AI	18.9 ± 30.7	3.9 ± 9.2	30.3 ± 36.3	**<0.001***
Kinetic Tremor	3.7 ± 0.7	3.7 ± 0.5	3.7 ± 0.8	0.948
Kinetic - AI	7.3 ± 11.4	3.7 ± 9.0	10.0 ± 12.4	0.074**





CONCLUSIONS

The study highlights the possible role of upper limbs action tremor asymmetry as an adjunctive feature to be considered in ET clinical phenotyping.