Postural Orthostatic Tachycardia Syndrome (POTS) is associated with significant symptoms and functional impairment.

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Introduction

Postural orthostatic tachycardia syndrome (POTS) is an increasingly recognised condition resulting from autonomic dysfunction associated with orthostatic intolerance.

POTS is characterised by an increase in heart rate on assuming the upright position of greater than 30 beats and/or to above 120 beats per minute (bpm) within 10 minutes.

Patients with POTS frequently describe debilitating symptoms that include severe dizziness, fatigue and pre-syncope which commonly affect their work and social lives. The condition is rare, leading to patients often being misdiagnosed due to symptom overlap with vasovagal syncope ('simple faint'). Symptoms in this patient group have not been thoroughly explored and quantified.

Aim

- Determine the prevalence of factors such as cognitive impairment, fatigue, daytime somnolence, reduced functional ability and autonomic symptom burden in this patient group.
- Explore how these factors associate with autonomic dysfunction.

Method

Patients' case notes were initially reviewed to identify a cohort of 83 patients with a documented diagnosis of POTS at the Falls and Syncope Service (FASS) at the Royal Victoria Infirmary in Newcastle. 170 POTS patients were also identified through their membership to the patient-led organisation POTSUK. Both cohorts of clinic and POTSUK patients were subsequently sent identical symptom assessment tools in the form of a collection of standardised questionnaires, by post and email respectively.

Haemodynamic data from diagnosis was also collected from 22 patients identified in the FASS clinic by measures of 'active stand' or 'tilt-table' testing. This was to assess possible correlation of symptom profiles with autonomic dysfunction.

Returned questionnaires and haemodynamic data were inputted into a database and analysed for statistical significance using IBM SPSS Statistics Software.

References

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Results

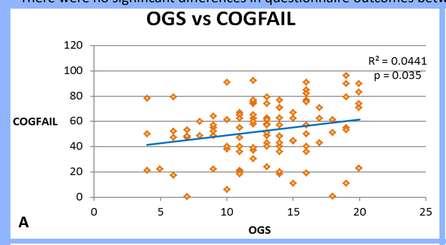
Response rates of the two cohorts came to 43 clinic patients (51.8%) and 87 POTSUK patients (51.2%) resulting in a final cohort of 130 patients. Age and gender differences between non-responders in the clinic group were insignificant (p= 1.0,0.5 respectively); data for non-responders for POTSUK was unavailable.

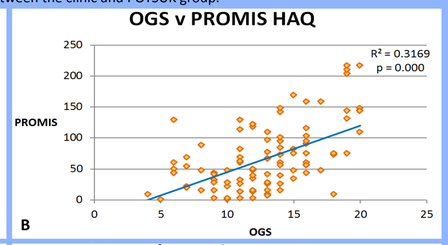
Demographics

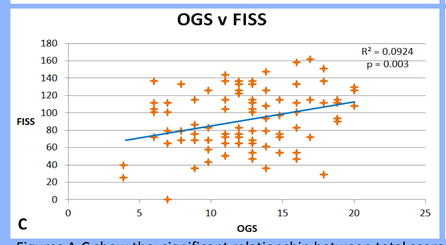
POTS was found predominantly in Caucasian women aged 20-40 years (89.2% female, mean ± SD age 33.4 ± 10.2 years, 98% Caucasian). 30.8% (n=40) of patients were on disability allowance, of which 72.5% (n=29) stated was due to their POTS.

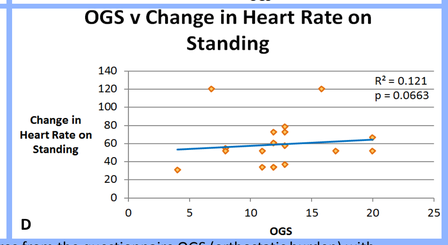
Questionnaire	Patient perceived levels	Clinic + POTSUK **Median Score *** (25^{th} , 75^{th} percentile)
Cognitive Failures Questionnaire (COGFAIL)[1]	Cognition	53 (40.0,66.5)
Orthostatic Grading Scale (OGS)[2]	Symptoms on change in posture	13 (11.0,16.0)
Fatigue Impact Score (FIS)[3]	Fatigue	95 (67.0,115.0)
Epworth Sleepiness Scale (ESS)[4]	Daytime drowsiness	10 (6.0,13.0)
Health Assessment Questionnaire (PROMIS HAQ)[5]	Functional ability	56 (28.1,93.8)
Hospital Anxiety and Depression Scale (HADS)[6]	Anxiety Depression	7 (4.75,10.0) 7 (5.0,10.0)

*There were no significant differences in questionnaire outcomes between the clinic and POTSUK group.









Figures A-C show the significant relationship between total scores from the questionnaire OGS (orthostatic burden) with perceived levels of cognition (A), functionality (B) and fatigue (C). (D) shows the insignificant relationship to OGS and observed change in heart rate change on standing at diagnosis)

Symptom Burden

Average scores for all questionnaire outcomes were high indicative of increased burden. Below are the results of the statistical analysis:

- Median duration of ongoing symptoms was 6 years (25^{th} and 75^{th} percentile=3,13).
- 47.7% (n=43) of patients reported memory impairment to be a core symptom. There was a significant relationship between level of impaired cognition and major depression (p=0.01).
- 41.5% of patients reported significant daytime sleepiness (ESS score 10+). However, POTS patients additionally suffering from Chronic Fatigue Syndrome(20%,n=20) did not have significantly increased ESS (p = 0.9).
- POTS is associated with significant functional impairment.

Haemodynamic Data

- Average increase in heart rate on standing was 53 bpm.
- OGS did not significantly correlate with measured change in heart rate on standing (R^2=0.12,p = 0.7), suggesting haemodynamic results does not necessarily reflect patient perceived orthostatic burden.(Fig. D)

Conclusions

- POTS has a global symptomatic effect on patients that can be highly debilitating.
- Patient perceived burden of change in posture is a good indicator of the level of fatigue, cognitive and functional impairment experienced.(Fig. A-C)
- Perceived cognitive impairment is a common problem in POTS that is highly significant in relation to increasing fatigue, daytime somnolence, functional ability and depression.

Discussion

POTS has a long patient reported average time to diagnosis of 6.7 years. This is partly due to lack of general awareness, uncertain pathophysiology and inconclusive management guidelines. POTS therefore warrants further research to establish aetiology, clinical manifestations and prognosis, in the hope of identifying more effective interventions based on individual patient symptom profiles. This will help us better understand the patient's needs and improve the global understanding of POTS.