A retrospective observational-cohort study of the relationship between reactive hypoglycaemia to Postural orthostatic tachycardia syndrome (PoTS)

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BACKGROUND

PoTS is a form of dysautonomia [3]. Determination of prevalence is difficult; however one study in the USA suggests 500,000 patients [1], with an incidence ratio of male to females 1:5. See Figure:1 for classification.
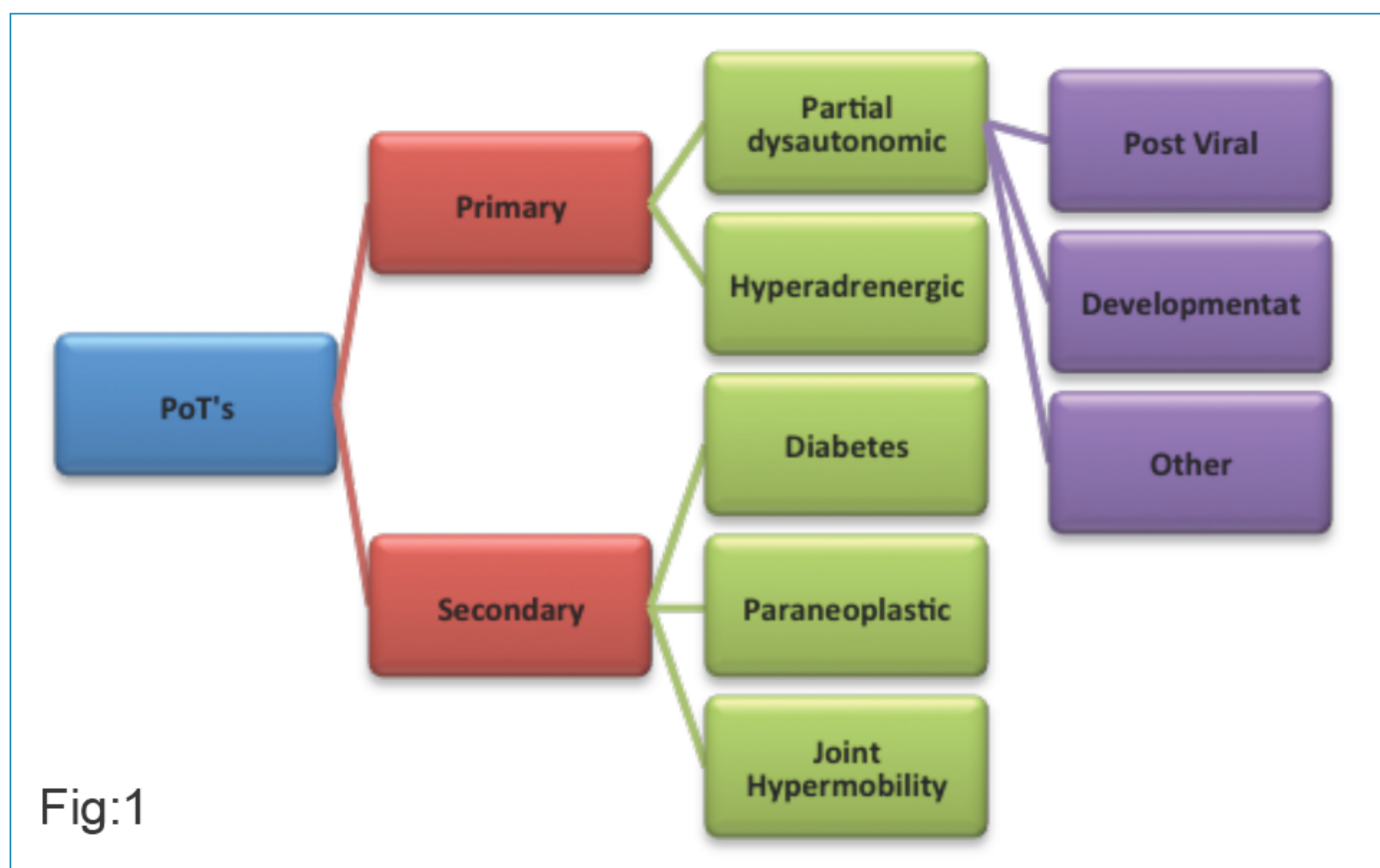

Fig:1

Its diagnosis is established by the presentation of heterogeneous group of disorders (Fig: 2), similar in their characteristic that are alleviated on lying, persistent increase in heart rate within ten minutes of standing and a Tilt Table Test [1][2].

Fig: 2 – Heterogeneous Disorders

Impaired concentration	Palpitation	Memory impairment
Dizziness	Tremulousness	Orthostatic headache
Sweating	Syncope / pre-syncope	Insomnia
Nausea	Fatigue	

• PoTS has many associated conditions, however its relationship to reactive hypoglycaemia has not previously been documented, despite a significant number presenting with suggestive symptoms.

AIM

• To perform a retrospective observational-cohort study of patients diagnosed with PoT's who undertook a 5 hour prolonged oral glucose tolerance test (POGTT).

Fig: 3 – Signs & Symptoms

Palpitation	Tremor	Sweating	Cold Extremities
Exhaustion	Confusion	Extreme Sugar Cravings	Headache / Dizziness

• To identify potential relationships between the physical and biochemical characteristics in potential carbohydrate metabolic disorders in individuals diagnosed with PoT'S.

PATIENT	0 mins	15 mins	30 mins	45 mins	60 mins	90 mins	120 mins	150 mins	180 mins	210 mins	240 mins	270 mins	300 mins
A	5	5.8	6.2	4.5	2.9	4	4	4.5	4.8	4.4	4.4	4.6	4.6
B	3.9	7.59	8.9	8.79	10	7.7	6.3	4.6	3.1	3.26	3.5	3.65	3.82
C	4.4	6	7.5	8.6	7.4	6	6.9	6.1	5.7	4.2	3.3	3.7	4.2
D	4.6	6.5	7.2	7.1	6.1	4.2	4.1	2.1	4.4	4.3	3.8	4.5	4.7
E	4.2	6.3	6.9	5.4	4.5	3.8	3.1	3.1	3.9	1.8	3.1	4.16	4.54
F	4.4	4.7	6.1	4.7	4	3	3.7	3.4	3.1	3.9	3.9	4.1	4.3
G	5.4	5.1	6.5	8.5	8.9	7.1	8.2	7.5	6.9	6.48	3.3	2.83	3.3
H	4.7	5	4.4	3.8	3.5	3.3	2.8	2.9	3.7	3.1	3.2	4.03	4.36
I	4.3	6.5	6.9	5.9	5.7	2.6	2.7	4.7	3.4	2.3	3.9	4	4.4
J	4.7	6	8.2	9.1	8.7	6.7	5.1	4.1	4.3	3.9	2.7	4.5	4.6
K	3.9	4.5	3.4	3.5	3.5	2.6	2.8	3.3	3.1	2.6	2.5	3.5	4.2
L	5.3	8	9.2	7.9	7.1	6.4	5.3	5	4.4	3.4	3.9	4.1	4.5
M	4.3	6.2	8.5	9.6	8.4	6.9	6.9	3.7	3.7	3.5	2.5	4.05	4.26
N	3.9	5	5	4.9	3.9	3.6	4.4	4	3.8	2.8	2	3.8	4.1
O	4.9	9	11.9	10.9	9.2	Patient too unwell from sugar load to continue							
P	3.8	6.4	7	7.5	5.5	5.5	6.1	4.6	4.6	??	??	??	2.4

Green: Peak Glucose
Red: Nadir Glucose

Fig:5

RESULTS

• POGTT in 17 women; mean age of 27.23 years (Range: 16-50 years of age) (Fig:5).
• Elevated fasting insulin levels noted in 30% of individuals.
• Cortisol levels at baseline excluded deficiency
• 41% achieved peak glucose levels at 30 minutes and 29% at 45 minutes.
• Symptoms of headaches, "groggy" sensation, tiredness, mild cognitive impairment, and coldness of extremities noted at peak in glucose in all individuals
• 57% attained nadir glucose (ranges: 1.8-3.4mmol/L) between 210-240 minutes
• Symptoms of dizziness, profound tiredness, hyperhidrosis, and intense food / sugar cravings noted at nadir glucose in all individuals
• Symptoms at both peak and nadir glucose persisted for 30 minutes in duration, resolving independently.

CONCLUSIONS

• Strong relationships between PoTs and fluctuations in blood glucose values

• Significant biphasic symptom response to peak and nadir glucose.

• Nadir glucose clustered around 4 hour time point.

• Our study is hampered by the small number and homogeneity of our participants; however patients report very significant improvement in symptoms with low carbohydrate / high protein diet and consumption of meals every 2-3 hours

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