

from another endometrial cancer-associated neuropathy case [1]. Overall, our case represents a sensorimotor neuropathy that is not associated with well-characterized anti-neuronal antibodies. Disappearance of serum antibodies in parallel with amelioration of symptoms suggests that these antibodies might be pathogenic. Also, the presence of inflammatory infiltrates in the tumor implies that the endometrial cancer might be expressing antigens stimulating an autoimmune attack against the peripheral nerve tissue by molecular mimicry. Our case further documents that paraneoplastic neuropathies comprise a wide range of clinical syndromes and may present with unusual clinical findings and tumor types. A high index of suspicion should be maintained for this potentially treatable clinical condition.

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An increase in systolic blood pressure and abnormal circadian blood pressure regulation in lean women with polycystic ovary syndrome

Dear Editor,

We have studied 24-h ambulatory systolic blood pressure (SBP) in women with lean polycystic ovary syndrome (PCOS) and in controls. The study group consisted of 45 lean patients with PCOS (age, 24.2 ± 4.4 yr; body mass index (BMI), 24.9 ± 6.1 kg/m²) while the control group was composed of 45 age- and BMI-matched healthy subjects. The diagnosis of PCOS was made when ≥ 2 of the following 3 criteria existed, as proposed at the Rotterdam Consensus Meeting: oligomenorrhea or amenorrhea, clinical hyperandrogenism and/or hyperandrogenemia, and polycystic ovaries [1]. All subjects gave written informed consent and the Ethics Committee of the University of Ufuk approved the study protocol.

Ambulatory blood pressure (ABP) measurements were performed using an Accutrack II blood pressure monitor (Suntech Medical Instruments Inc., Raleigh, NC, USA). Patients were considered “dippers” if the nocturnal SBP fall was $\geq 10\%$, but $< 20\%$, and “nondippers” if it was $\geq 0\%$ but $< 10\%$.

The BMI was calculated as: weight (kilograms)/height (meters)². Patients with a BMI < 25 kg/m² were considered as lean. Waist circumference was measured at the narrowest level between the costal margin and iliac crest, and the hip circumference was measured at the widest level over the buttocks while the subject was standing and breathing normally. The waist-to-hip ratio (WHR) was calculated. A WHR > 0.72 was considered as abnormal.

Serum levels of total testosterone (T) were measured with specific chemiluminescence assays from Roche Diagnostic (ELECYS 2010 HITACHI, Roche Diag. Germany). Free testosterone levels were measured by radioimmunoassay analysis. Samples were immediately centrifuged, and the serum was separated and frozen at -20 C until assayed. The insulin sensitivity index (ISI) was investigated by using basal insulin levels, fasting glucose, homeostasis model assessment (HOMA-IR > 2.1). HOMA-IR was calculated as: fasting glucose (mg/dL) \times fasting insulin (μ U/ml) $\times 0.055/22.5$ [2].

Data analysis was performed by using SPSS for Windows, version 11.5. The differences between PCOS and control groups were evaluated by using Student's *t*- or Mann-Whitney *U*-test, where appropriate. Degrees of association between continuous variables were calculated by Pearson's correlation coefficient. Multiple linear regression stepwise method was used to determine the independent predictors.

We found that 24-h ambulatory SBP, daytime and nighttime, was higher in lean PCOS patients than controls ($p < 0.001$). The frequency of nocturnal systolic (48.8% vs 0%, $\chi^2 = 14.2$, $p < 0.01$) and diastolic nondipper pattern (34% vs 0%, $\chi^2 = 18.1$, $p < 0.001$) was higher in PCOS women; compared with lean controls. Nighttime heart rate was higher in lean PCOS patients than controls ($p < 0.01$). The study revealed that HOMA index and testosterone levels are independent determinants of both systolic blood pressure and nondipper pattern. In addition, the waist-to-hip ratio and HOMA index were significantly higher than in control subjects (0.83 ± 0.09 vs 0.76 ± 0.07 , $p < 0.05$, respectively) (Table 1).

In previous studies, while Zimmermann et al. [3] could not determine a relation between blood pressure and insulin resis-

Table 1

Ambulatory blood pressure and heart rate profiles between lean PCOS patients and healthy controls.

Ambulatory blood pressure	PCOS (n=45)	Control (n=45)
24 h		
Systolic BP (mmHg)	122.3 \pm 3.6	114.8 \pm 7.5*
Diastolic BP (mmHg)	72.3 \pm 4.1	69.3 \pm 5.6
Mean arterial BP (mmHg)	85.9 \pm 5.5	78.2 \pm 5.5†
Daytime		
Systolic BP (mmHg)	125.2 \pm 5.7	116.2 \pm 4.5*
Diastolic BP (mmHg)	72.2 \pm 4.3	69.1 \pm 9.0
Mean arterial BP (mmHg)	84.7 \pm 6.6	76.9 \pm 9.1
Nighttime		
Systolic BP (mmHg)	119.4 \pm 6.7	101.2 \pm 8.2*
Diastolic BP (mmHg)	68.1 \pm 6.9	64.2 \pm 9.0
Mean arterial BP (mmHg)	80.1 \pm 6.8	74.4 \pm 7.7†
Heart rate		
24 h (beat/min)	76.3 \pm 4.1	74.3 \pm 4.1
Daytime	72.3 \pm 5.8	71.0 \pm 8.3
Nighttime	77.5 \pm 4.7	69.1 \pm 9.8†

Statistical significance was defined as $p < 0.05$.

* Statistical significance was defined as $p < 0.001$.

† Statistical significance was defined as $p < 0.01$.

tance, Holte et al. [4] determined a relation between elevated SBP and IR in both obese and lean patients. The excess in fat mass leads to an increase in free fatty acid levels and also increased secretion of inflammatory cytokines such as interleukin-6. IL-6 stimulates the central nervous system and the sympathetic nervous system, which may result in hypertension [5]. Therefore, the increase in SBP found in lean PCOS patients is probably related to insulin resistance and WHR.

Our study revealed that HOMA index and testosterone are independent determinants of nondipper pattern in lean PCOS patients. The frequency of nondipper pattern was higher in women with PCOS when compared with lean controls. These data suggested that nondipper pattern is most probably related to insulin resistance and hyperandrogenemia in lean PCOS patients. Our data showed that lean women with PCOS presented a higher heart rate during nighttime when compared with the control group. This difference was found to be associated with increased free and total testosterone levels, WHR, and HOMA index. Serum testosterone level was previously identified as an independent predictor of sympathetic nerve activity to the muscle vascular bed in PCOS [5]. In this study also, elevated nighttime heart rate was found to be correlated with free and total testosterone, and fasting insulin levels.

In conclusion, abnormalities in the regulation of blood pressure, including an increased ambulatory SBP, an increased nondipper pattern and an increased nighttime heart rate, are most common in lean PCOS patients. The study revealed that increased insulin resistance, WHR, as well as hyperandrogenemia may contribute to enhanced blood pressure variability in lean PCOS patients. Our study implies that practitioners should be aware of the risk of blood pressure abnormalities in lean PCOS patients with IR, increased WHR and hyperandrogenemia.

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Isolated torsion of the fallopian tube in a patient with polycystic ovarian syndrome (PCOS)

Dear Editor,

We present a case of chronic severe pelvic pain in a 31-year-old woman with known polycystic ovarian syndrome, later found to have isolated torsion of her left fallopian tube at laparoscopy. Following de-torsion, she became pain free.

A 31-year-old primiparous woman was seen in the gynaecology outpatient department complaining of recurrent episodes of severe pelvic pain lasting hours to days. She had been diagnosed with polycystic ovarian syndrome in 2005 after investigations prompted by secondary amenorrhoea and delayed conception. She had previous emergency admissions for the same pain 7 years ago, but investigations were inconclusive and she was managed conservatively. On this occasion, an ultrasound scan performed prior to her clinic appointment showed a 16 mm × 7 mm suspected hydrosalpinx and a small amount of free fluid. Preliminary investigations including haemoglobin and white cell count, mid-stream urine culture and genital swabs were all normal. In view of her recurrent symptoms, abnormal ultrasound finding and anxiety related to fertility, she was listed for a diagnostic laparoscopy with dye test. At laparoscopy, the right adnexa looked normal. Both ovaries looked bulky and polycystic. The left tube, however, was twisted on its distal part three times, although the tube itself appeared healthy (Fig. 1). Dye test was initially negative on the left side but following successful de-torsion, free spill of dye was seen. The postoperative course was uneventful and the patient was discharged the next day. She was followed up 6 weeks later and reported her symptoms had completely resolved. Pre-operative pain scale was reported as 8–9 but this had reduced to 0.

To the best of our knowledge this is the first reported case of isolated fallopian tube torsion in a patient with known polycystic ovarian syndrome (PCOS). Chronic pelvic pain is not a clinical feature commonly associated with PCOS and isolated torsion of the fallopian tube is a rare cause of acute and chronic lower abdominal pain with an incidence of 1 in 1,500,000 women [1]. It is difficult to argue an association between PCOS and isolated fallopian tube torsion from this single case and it would require a case series to test the hypothesis. However there has been a published case report of unilateral adnexal infarction associated with PCOS [2] which could have commenced with adnexal torsion although no direct evidence exists for this link. On a practical note, we feel it is

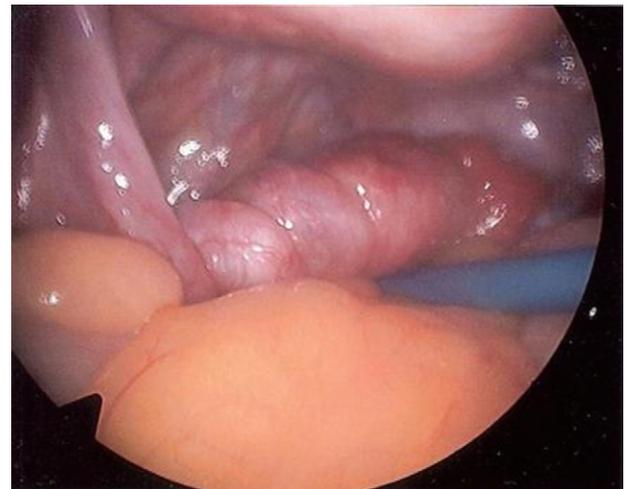


Fig. 1. Laparoscopic image of the pelvis showing torsion of the left fallopian tube.