

# Association between pain threshold measure and postoperative recovery after benign hysterectomy

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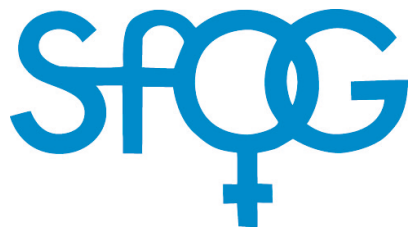
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## **Jävsdeklaration**

- Det finns inga intressekonflikter eller jäv att redovisa.



# Introduction

- **Objective:**
  - To evaluate the association between preoperative pressure and thermal pain thresholds and trajectory of postoperative pain intensity and sum score of symptoms after benign hysterectomy.



# Method

- Prospective, single blinded, multicenter observational study
- Five hospital in southeast Sweden participated during 2011-2017
  - Linköping, Norrköping, Jönköping, Värnamo, Eksjö
  - Abdominal or vaginal hysterectomy for benign conditions
- 406 patients were enrolled
  - 18-60 years
  - At least one ovary left after operation
  - Written consent before inclusion



# Quantitative Sensory Testing (QST)

QST – a method to quantitatively measure sensory nerve function based on a subjects response

QST measures pressure (PPT), heat (HPT) and cold (CPT) pain thresholds preoperatively

- Four locations:
  - The back, just below 5th lumbar vertebra
  - Anterior abdominal wall, 7 cm lateral to the umbilicus on both sides.
  - Tuberositas tibia of the dominant leg as control



# QST for heat and cold

- Standardized protocol
- Thermode 3x3 cm<sup>2</sup>
- Start at 32 °C
- Raises or decreases to max 50 °C or min 0 °C.
- First painfull stimulus
- Repeated x3:
  - Average temperature





# QST for pressure

- Handheld electronic algometer
- Probe area 1 cm<sup>2</sup>
- Standardized constant pressure rate
- Patient says stop at first sensation of pain
- Repeated x3
  - Average pressure registered





# Pain thresholds

- Pain thresholds were categorized as high or low using cut-off levels:
  - 25th percentile for pressure and heat
  - 75th percentile for cold





# Swedish Postoperative Symptom Questionnaire

- A validated self-reporting questionnaire
- Filled in on 13 occasions during 6-weeks follow-up
- Rating of pain intensity (0 (no pain) – 6 (very severe pain))
- Sum score of eight common postoperative symptoms constitutes a measure of the overall discomfort
  - nausea, retching, headache, abdominal pain, tiredness, drowsiness, blurred vision, and itching
  - Intensity grading of symptoms (0 (none) – 3 (a lot))
  - The higher the sum score the more discomfort (range 0-24)



# Results

Demographic and clinical characteristics of 406 women undergoing benign hysterectomy

<b>Age group</b>	≤ 40 years	52 (12.8%)
	40-50 years	264 (65.0%)
	> 50 years	90 (22.2%)
<b>BMI group</b>	Normal weight	180 (44.3%)
	Overweight	135 (33.3%)
	Obese	91 (22.4%)
<b>Parous</b>		351 (86.5%)
<b>Smoking</b>		49 (12.4%)
<b>Co-morbidity</b>	Cardio-vascular disease	57 (14.0%)
	Mental illness	54 (13.3%)
	Chronic pain disorder	96 (23.6%)
<b>ASA classification</b>	Class 1	270 (66.5%)
	Class 2	124 (30.5%)
	Class 3	12 (3.0%)
<b>Previous laparotomy</b>		132 (32.5%)
<b>Hysterectomy indication</b>	Myoma uteri	193 (47.5%)
	Bleeding disorder	106 (26.1%)
	Myoma and bleeding	45 (11.1%)
	Cervical dysplasia	37 (9.1%)
	Pain	23 (5.7%)
	Others	2 (0.5%)
<b>Mode of hysterectomy</b>	Total abdominal	294 (72.4%)
	Subtotal abdominal	25 (6.2%)
	Vaginal	87 (21.4%)
<b>Grading of complications <sup>a</sup></b>	Grade 0	284 (70.0%)
	Grade I	49 (12.1%)
	Grade II	59 (14.5%)
	Grade III	14 (3.4%)

Figures denote mean (SD) or number (%).

ASA - American Society of Anesthesiologists classification; BMI - body mass index.

<sup>a</sup> Clavien-Dindo grading of complications within six weeks postoperatively



# Results

- PPT:
  - Cut-off level of high vs. low pain threshold: 481 kPa
- HPT:
  - Cut-off level of high vs. low pain threshold: 46.1 °C
- CPT:
  - Cut-off level of low vs. high pain threshold: 5.7 °C

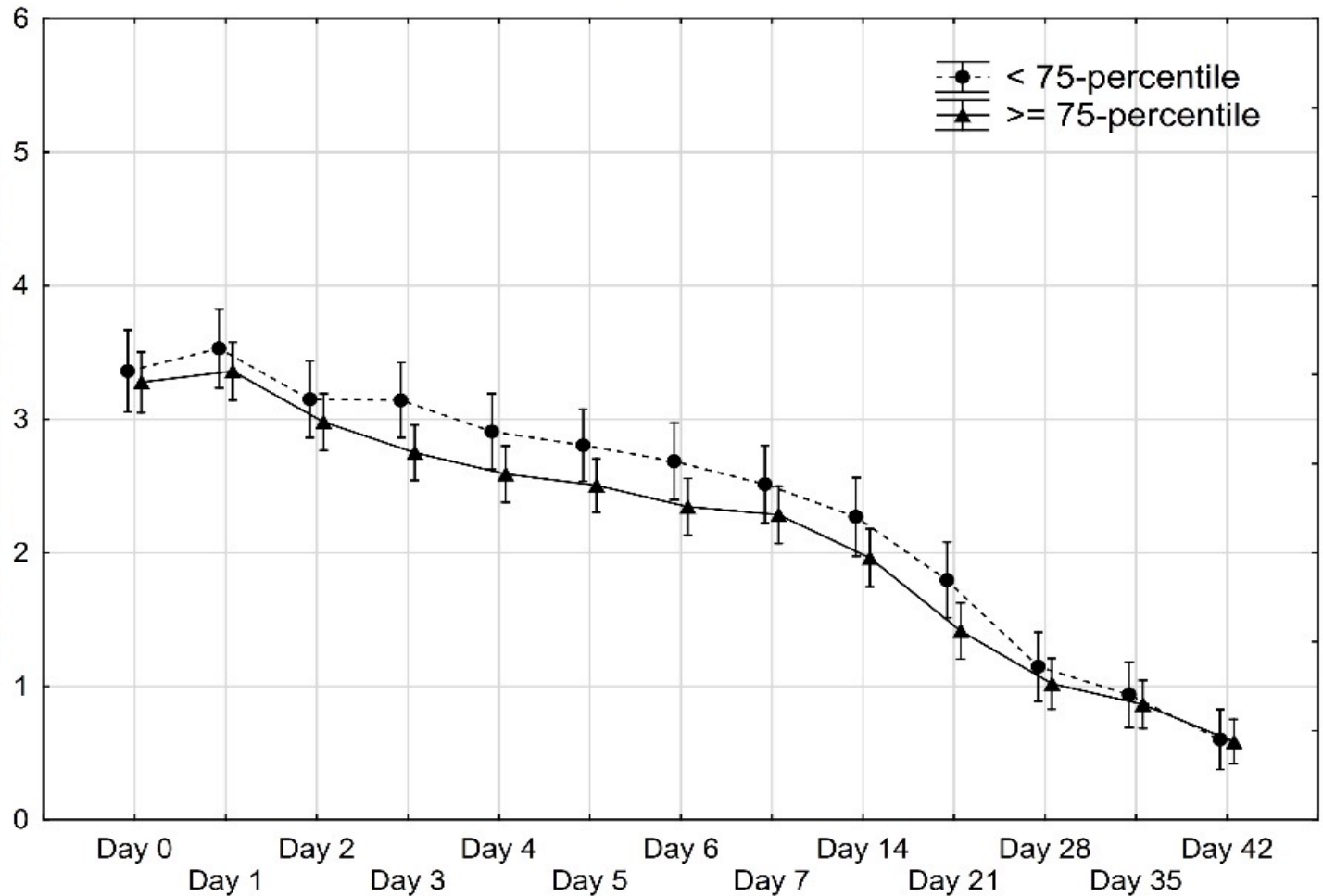


# Results

- CPT was significantly associated with pain intensity and symptom sum score but not HPT or PPT.
- Women with low CPT reported higher pain intensity and more discomfort of postoperative symptoms

## Cold pain threshold

Pain intensity rating

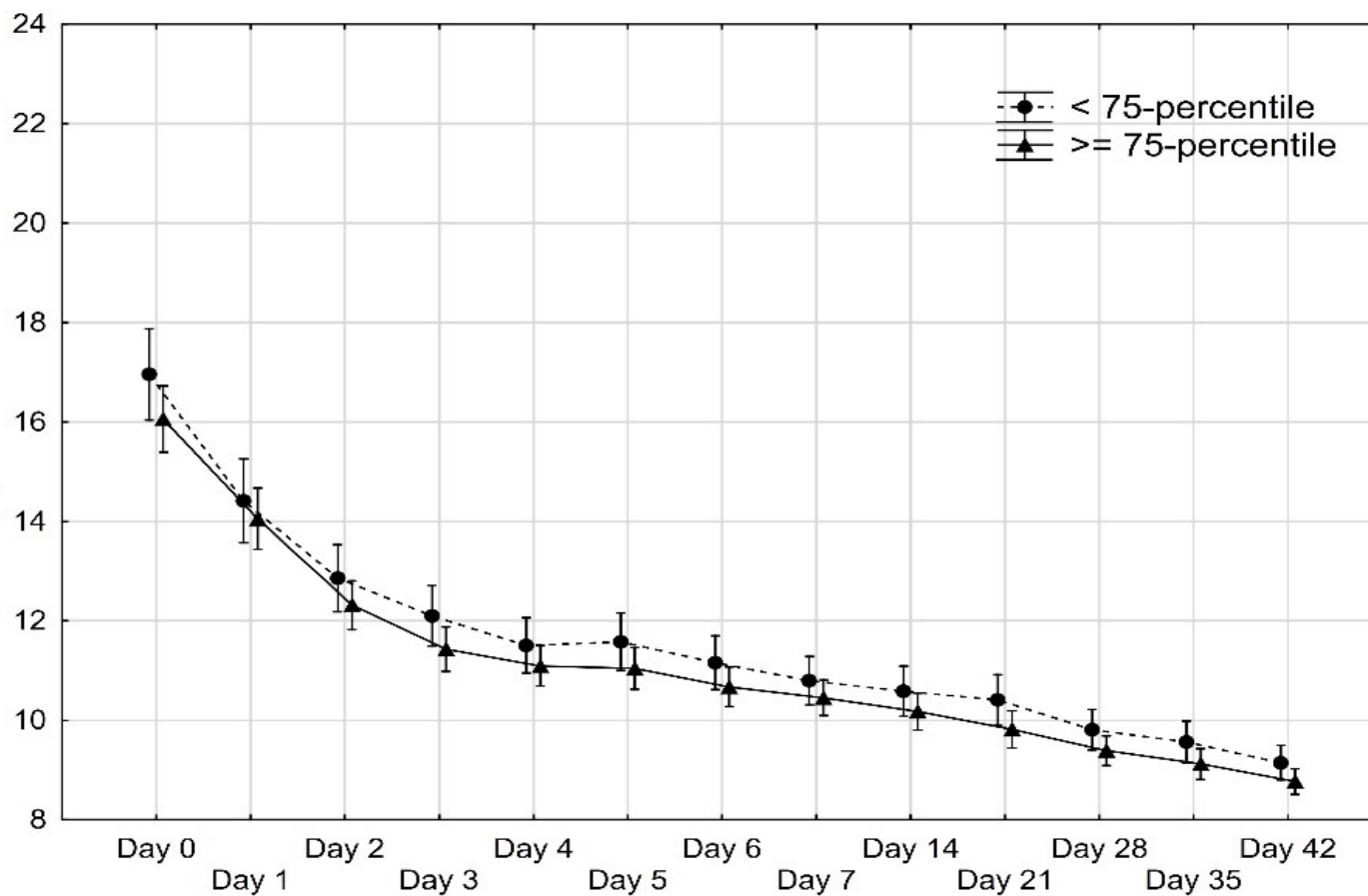


Plots indicate mean and bars 95%CI.  $p=0.02$ , repeated measures ANOVA, Adjusted for consumption of opioids day 0-7, non-opioids day 0-15, chronic pain disorder, and mental illness.



## Cold pain threshold

Symptom sum score



Plots indicate mean and bars 95%CI.  $p=0.04$ , repeated measures ANOVA, Adjusted for consumption of opioids day 0-7, non-opioids day 0-15, chronic pain disorder, and mental illness.



# Conclusion

- Hypersensitivity for cold seems to predict pain intensity and symptom sum score after benign hysterectomy.
- QST, in particular measurement of cold pain threshold, might potentially be used to improve recovery after benign hysterectomy by individualizing and tailoring postoperative treatment for patients with low pain threshold.
- Interventional studies are needed to verify this hypothesis