

Chelimsky TC, Low PA, et al. Value of Autonomic Testing in Reflex Sympathetic Dystrophy [RSD]. Mayo Clin Proc 1995;70:1029-40.

Design: Retrospective review

Population/sample size:

- 387 patients (126 men, 261 women, median age 41) referred to Mayo Clinic Autonomic Lab for RSD testing over 5 year period
- Clinical records & lab data were reviewed by 2 authors independently, abstracting symptoms and signs from chart entries in order to create a composite score for the diagnosis of RSD

Main outcome measures:

- Composite RSD score was weighted mean for all non-zero values of 6 subscales (0=indeterminate, 1=absent, 2=mild, 3=moderate, 4=severe) for (1) protopathia (visceral, poorly localized pain), (2) allodynia, (3) vasomotor changes by history or (4) vasomotor changes by examination, (5) swelling by history or (6) swelling by examination
- Allodynia and vasomotor/swelling by examination were given double weight; protopathia and vasomotor/swelling by history given single weight
- RSD defined as present if score was 2.5 or greater on RSD composite scale
- Lab results retrieved by reviewers; three lab tests were examined: (1) Resting Skin Temperature (RST) asymmetries, with affected limb either 0.5° warmer or cooler than contralateral side, (2) Resting Sweat Output (RSO) asymmetry, (3) Quantitative Sudomotor Axon Reflex Test (QSART) done by iontophoresis of acetylcholine (ACh) into skin, with sweat output asymmetry as in RSO
- All 387 patients had autonomic testing; 299 had x-ray bone density study, 165 had bone scanning, and 120 had sympathetic block (>50% relief for 1 hour defined as "RSD-specific criterion")
- Reduction of QSART score (depressed response to ACh) had best correlation of autonomic tests with RSD composite score (p=.003), RSO (p=.014) and RST (p=.046) also correlated with RSD score
- RST correlated with both measures of sweat output, but the two sweat tests (RSO and QSART) did not correlate with one another
- Best predictor of response to sympathetic block was duration of symptoms less than 6 months; clinical diagnosis of RSD was disappointing predictor
- RST and QSART jointly predicted response to sympathetic block in lower limb; when RST was normal and QSART was abnormal bilaterally, 0/4 patients responded; when RST was increased and QSART was not abnormal bilaterally, 9/9 patients responded
- When severe allodynia was present, 5/5 patients responded to sympathetic block
- No test was individually sensitive for diagnosis of RSD; but increased RSO and depressed QSART were jointly 98% specific for RSD

Authors' conclusions:

- Clinical diagnosis of RSD marginally predictive of response to sympathetic block; 62% of patients with clinical RSD responded, and 43% of those without RSD responded
- Sudomotor tests highly specific (helpful when present), but insensitive
- Increased skin temperature provided prognostic information (response to sympathetic block), and is associated with shorter duration of pain, both when RSD is present and when it is absent; therefore thermography not helpful in differentiating RSD from non-RSD pain
- Chronic limb pain in and of itself is associated with autonomic alterations
- Abnormal QSART bilaterally (increased or decreased) predicts poor response to sympathetic block in lower extremity pain; unilateral abnormality does not predict poor response to block
- Better response to sympathetic block in warm limbs provides evidence against sympathetic overactivity and suggests "nociceptor hypersensitivity to low sympathetic nerve activity"

Comments:

- Some numerical analyses uninformative; for example, p values for correlation coefficients are less valuable than the coefficients themselves
- The "gold standard" appears to have been constructed on the basis of an RSD score with a cutoff of 205 points; it is not clear whether this is intended to serve as a general reference standard for CRPS-I, and the sensitivity/specificity of the QSART depends on this issue
- Because of the retrospective nature of the study, it should be seen as an exploration of the relationship between QSART and CRPS, not as a definitive study
- Similarly, number of patients with and without RSD not stated in text, but must be calculated by reader from bar graphs
- Some quantitative relationships in text are not consistent with those in tables; for example, text states that best overall predictor of response to sympathetic block in Table 6 was duration of sx <6 mo, but here the response ratio is only 1.38 in favor of subjects with short duration and chi-square 3.66 (p=.056) rather than p=.004 as stated in Table 6, assuming that 34/54 patients with <6 mo responded and 30/66 with duration >6 mo
- Swelling was stronger predictor of response to sympathetic block than duration <6 mo (response ratio 1.55) and warm skin still stronger predictor (response ratio 3.26); both p values correctly stated in Table 6
- Abnormal QSART defined as falling above 95th or below 5th percentile of reference population, and will be defined as abnormal in 10% of all subjects
- 223 of the 367 patients had upper limb involvement, yet Table 5 does not present data for the predictive value of QSART in these patients

- The overall focus of the study is difficult to determine; if the use of QSART as a diagnostic test for RSD is the principal outcome, the data presented do not clearly show its usefulness

Assessment: Inadequate as evidence of the diagnostic efficacy of QSART for CRPS