Assessment of skin involvement in scleroderma

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Overview

• Clinical assessment of skin sclerosis
  – Historical perspective
  – Validity and variability
  – What does skin score measure?
• Association with disease outcome
• Natural history of skin involvement in dcSSc
• Skin score as an outcome measure in controlled clinical trials – what should we be looking for?
• Mathematical modelling of skin score change
Clinical assessment of skin sclerosis

• Historical perspective
  – Farmer et al (1960), Barnett et al (1969) – noted that extensive skin change was associated with major visceral involvement in SSc

• Rodnan et al (1979) Validated a semi-quantitative skin thickness score assessment tool (devised in 1968) by weighing skin biopsies and measuring collagen content.
  – Rodnan total skin score (TSS) assessed 26 areas 0 to 4 (max. 104).
  – 22 site modified RSS (0 to 3, maximum 66) – Kahaleh et al 1986
  – 10 site modified RSS (0 to 3, maximum 30) – Clements et al 1990
  – 17 site modified RSS (0 to 3, maximum 51) – Clements et al 1993
Variability and validity

Inter- and intraobserver reproducibility

- Brennan et al. 1992 – 17 site mRSS superior to manikin method *J Rheum*.
- Clements et al. 1993 – multiple assessments (D-penicillamine study group). Within patient SD 5 units. *Arthritis Rheum*.
- Clements et al. 1995 – intraobserver variability data from 3 assessments within 8 weeks. *J Rheum*
  - Coefficient of variation (CV) for interobserver variability 25% (accuracy)
  - CV for intraobserver variability 12% (reproducibility)
- Silman et al. 1995. Is it possible to reduce observer variability in skin score assessment of scleroderma? *J Rheum*
  - The ad hoc International Group on the Assessment of Disease Outcome in Scleroderma.
Prognostic implications

• Several studies demonstrate that outcome is associated with baseline skin score
Prognostic implications

• Change in skin score associates with visceral complications and outcome
What is skin score measuring?

- **Durometry**

- **Elastometry**

- **Ultrasound**

- **Biochemical correlates**
Practical approaches to skin score

• 17 site assessment system most widely used
• Score thickness rather than tethering should be assessed
• Limited cutaneous disease and overlap syndromes can be especially challenging
• Influence of co-morbidity including soft tissue swelling, loss of subcutaneous fat, skin oedema
Skin sclerosis score

Modified Rodnan Skin score

- Face: 3
- Neck: 3
- Anterior chest: 3
- Abdomen: 3
- Back - upper: 3
- Back - lower: 3
- Upper arm: 3 3
- Forearm: 3 3
- Hand: 3 3
- Fingers: 3 3
- Thigh: 3 3
- Leg: 3 3
- Foot: 3 3

Maximum (17 site) 51
20 site 60
Duration of disease in dcSSc at peak skin score

Royal Free Database analysis – Denton, Black et al 2002
Serial skin scores in dcSSc

Serial mRss in four patients with early dcSSc

Disease duration (yrs)
Time to death or major organ-based morbidity in early dcSSc

Royal Free early dcSSc cohort analysis, n=225

Shand, Black, Denton, 2004
Frequency of major organ endpoints attained in diffuse systemic sclerosis (n = 225)

- Heart endpoint met by 19% Males, 5% Females (p = 0.02)
Timing of end-point events in dcSSc

Time to Skin Endpoint

Time to Renal Endpoint

Time to Lung Endpoint

Time to Cardiac Endpoint

n = 225 dcSSc cases
Conclusions

• Skin score often peaks within one year of dcSSc onset.
• There is an association between severe skin involvement and burden of organ-based complications.
• Death or major organ based morbidity occurs in 50% of dcSSc cases within 3 years of disease onset.
• Stabilisation or improvement in skin sclerosis within 2 years of diagnosis may confound studies designed to prevent skin score worsening.
• Latent Trajectory Modelling identifies distinct subgroups defined by skin score
## Acknowledgements

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