

# Semi-quantitative Assessment of Amyloid in Congo Red-stained Subcutaneous Abdominal Fat Tissue in Systemic Amyloidosis and Disease Severity

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## INTRODUCTION

Aspiration of subcutaneous abdominal fat tissue is a simple and fast method for detecting systemic amyloidosis. It is not known whether intensity of amyloid deposition in fat tissue of patients with systemic amyloidosis is related with severity of the disease.

## OBJECTIVE

To assess the amount of amyloid deposition in fat tissue and to study its relation with clinical characteristics, the number of organs involved, and survival of these patients.

## METHODS

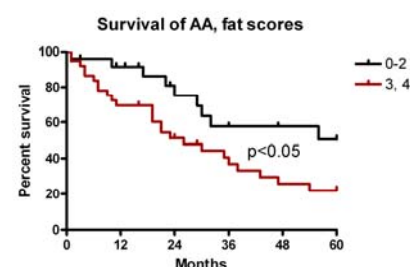
All patients with established systemic amyloidosis who visited our tertiary referral hospital between 1994 and 2004 were included in the study. Patients underwent subcutaneous abdominal fat aspiration and Congo red-stained fat smears were scored semi-quantitatively (ranging from 0 to 4+) by two independent observers. The amyloid scores were related to severity of organ involvement, the number of organs involved (from 1 to 4), and survival.

## RESULTS

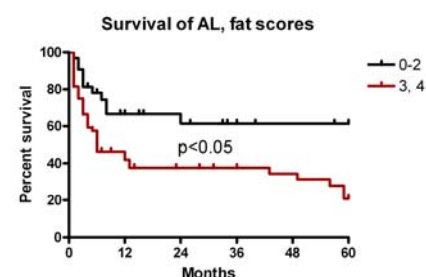
One hundred and ninety-two patients with established systemic amyloidosis participated in the study: 64 AA-type, 98 AL-type, and 30 ATTR-type. The amyloid scores did not differ among the disease groups, but scores were higher ( $P = 0.0002$ ) in women than in men. The most prominent difference was present in score 4+, i.e. 46% of women and 19% of men. Within the AA group no relation was detected between the amyloid score and duration of underlying disease. In AA and AL the patients with score 4+ were median 3.5 years older than those with lower scores, but this difference was not significant.

Both in AA and AL type the number of organs involved was higher ( $P < 0.05$ ) in the patients with higher scores than in the others. The amyloid scores did not correlate with proteinuria, creatinine clearance and serum Alkaline Phosphatase levels in AA and AL patients.

Survival was worse in AA and AL patients with score  $\geq 3+$  compared to those with lower scores ( $P < 0.05$  for both, figure 1 and 2).



**Figure 1.** Survival of patients with AA amyloidosis with low amyloid content (score 0-2, black line) vs. high amyloid content (score 3 and 4, red line).



**Figure 2.** Survival of patients with AL amyloidosis with low amyloid content (score 0-2, black line) vs. high amyloid content (score 3 and 4, red line).

## CONCLUSIONS

- **Semi-quantitatively measured quantity of amyloid in fat tissue is related with the number of organs involved and with worse survival**
- **Unexpected and unexplained is the finding that more amyloid is detected in fat tissue of women than men**