The use of machine learning methods to identify distinct clusters of clinical phenotypes and survival patterns among chronic graft-versus-host-disease (cGVHD) patients
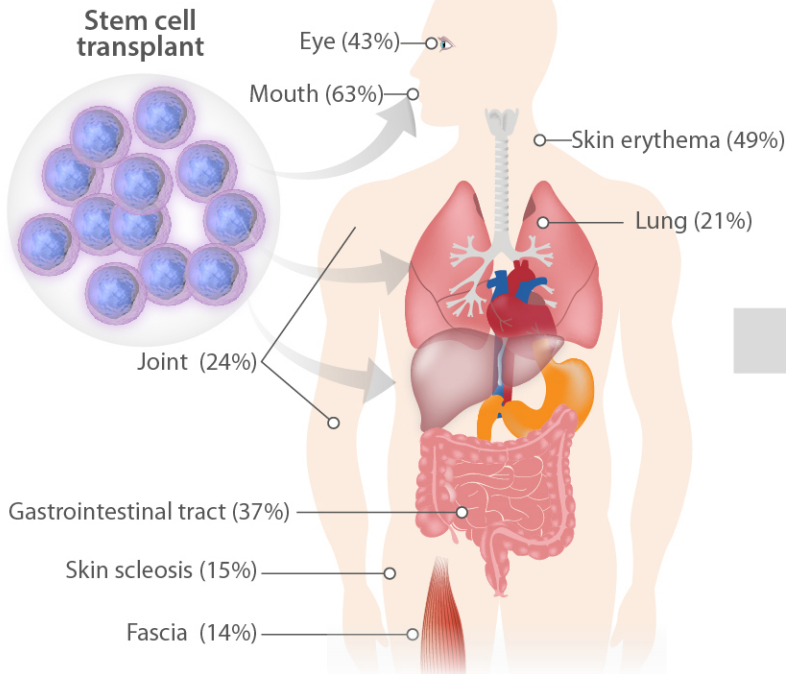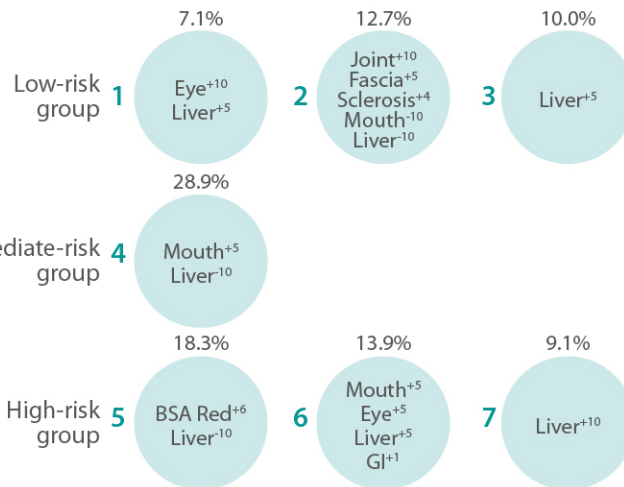
339 Patients with incident cGVHD

Stem cell transplant

Eye (43%)
Mouth (63%)
Skin erythema (49%)
Lung (21%)
Joint (24%)
Gastrointestinal tract (37%)
Skin scleosis (15%)
Fascia (14%)

Machine learning

Computational analysis of %

Erythema   Fascia
Eye   Joint
Liver   Mouth
Gastrointestinal   Sclerosis

7 unique patient clusters
with differential clinical phenotype and risks

Low-risk group

1 — 7.1% — Eye^{+10} Liver^{+5}

2 — 12.7% — Joint^{+10} Fascia^{+5} Sclerosis^{+4} Mouth^{-10} Liver^{-10}

3 — 10.0% — Liver^{+5}

Intermediate-risk group

4 — 28.9% — Mouth^{+5} Liver^{-10}

High-risk group

5 — 18.3% — BSA Red^{+6} Liver^{-10}

6 — 13.9% — Mouth^{+5} Eye^{+5} Liver^{+5} GI^{+1}

7 — 9.1% — Liver^{+10}

NIH severity score

167 — 49.3% Intermediate severity

141 — 41.6% High severity

Time from cGVHD to death

High-risk vs low-risk   HR, 2.24% [95%CI 1.36-3.68] p=0.002
Intermediate-risk vs low-risk HR, 1.70% [95%CI 0.99-2.94] p=0.055

Gandelman *et al.*, Haematologica, 2019