Impact of autologous hematopoietic stem cell transplantation on retinal atrophy in multiple sclerosis

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Background

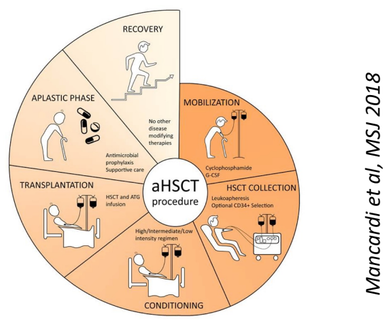
- Together with sustained suppression of clinical and MRI inflammatory activity, early accelerated brain volume loss - declining after the first year - is commonly observed following autologous hematopoietic stem cell transplantation (AHSCT) in multiple sclerosis (MS). Possible explanations for this phenomenon include treatment-related "neurotoxicity" as well as reduced inflammation-related "pseudoatrophy".
- The progressive thinning of peripapillary retinal nerve fiber layer (pRNFL) and of ganglion cell+inner plexifom layer (GCIPL) as assessed with optical coherence tomography (OCT) are considered biomarkers of neurodegeneration, while increased inner nuclear layer (INL) thickness might reflect inflammatory activity in MS.
- Data regarding the effect of AHSCT on retinal layers' thickness are still lacking.

Aims

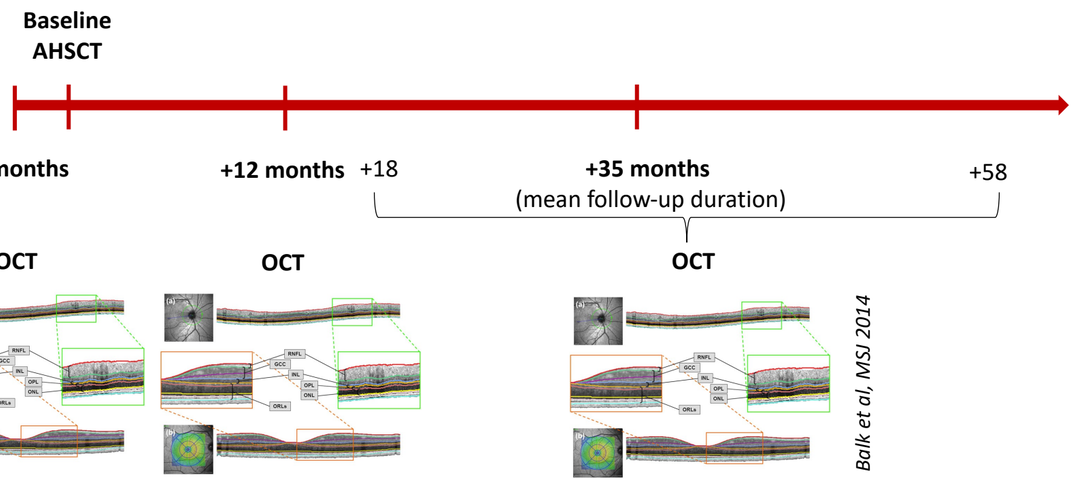
To assess how AHSCT affects medium-term evolution of retinal layers' thickness dynamics in MS.

Methods

- In this ongoing **prospective observational study patients undergoing AHSCT** at the MS Center of the University of Genoa underwent spectral-domain optical coherence tomography (**SD-OCT**) *(Spectralis, Heidelberg Engineering)* **scans 3 months before, 12-months after, and at least 18-months following transplantation.**
- Demographic characteristics and effectiveness outcomes throughout FU were collected.
- Patients with previous bilateral optic neuritis (ON) were not included. In patients with previous unilateral ON, only the non-affected eye was analyzed. In patients without history of ON and HC, OCT metrics were averaged over the two eyes.
- **Atrophy rates of pRNFL, GCIPL and INL were assessed at different timepoints**.



Mancardi et al, MSJ 2018

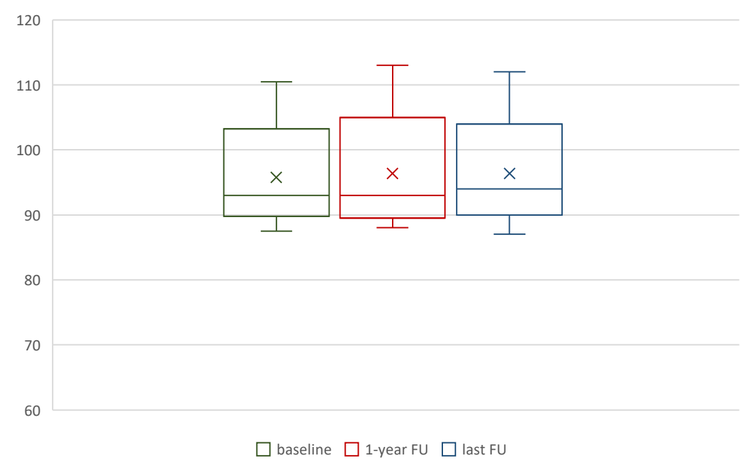


Balk et al, MSJ 2014

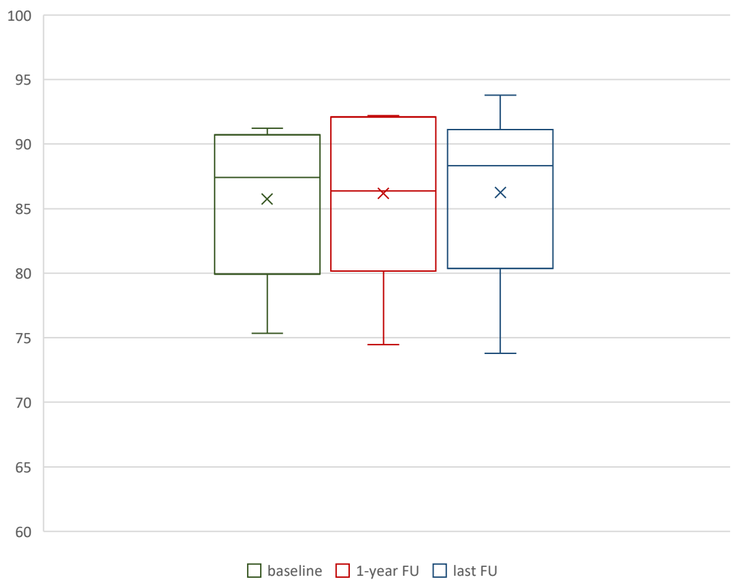
Results

Demographic characteristics and disease history	
	N=5
Relapsing-remitting course, n (%)	5 (100)
Mean (SD) age y	30.8 (10)
Female, n (%)	3 (60)
Median (range) baseline EDSS	4.5 (2-8)
Mean (SD) disease duration, y	11.8 (8)
Relapses following AHSCT, n (%)	0 (0)
Disease progression following AHSCT, n (%)	0 (0)
MRI activity following AHSCT, n (%)	0 (0)

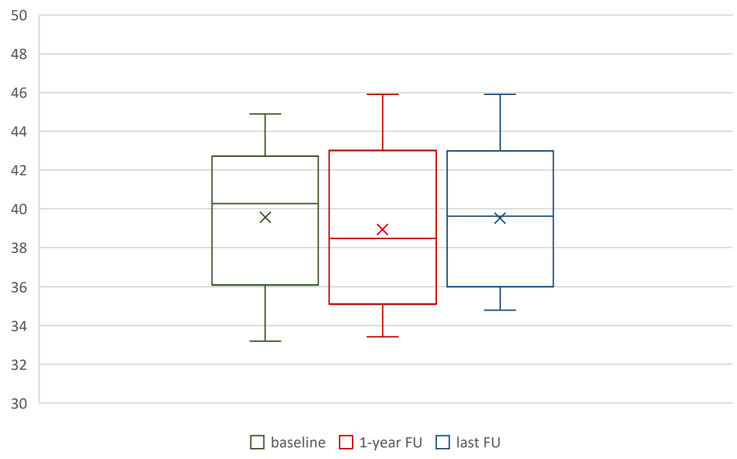
Baseline vs 12 moths vs last pRNFL thickness, µm
(95.8±8.8 vs 95.4±9.8 vs 96.4±9.3 µm)



Baseline vs 12 moths vs last GCIPL thickness, µm
(85.7±6.3 vs 85.9±7.1 vs 86.2±7.4 µm)



Baseline vs 12 moths vs last INL thickness, µm
(39.5±4.2 vs 38.9±4.6 vs 39.5±4.1 µm)



Conclusions

- We observed an **overall stability of neuro-axonal measures (pRNFL and GCIPL thickness)** during the 1st and up to 3-years following AHSCT, **together with an early transient INL thinning**.
- Although still very limited, our data might be consistent with the notion that **AHSCT-induced immunosuppression could reduce retinal inflammation resulting in declining INL volumes.**

Bibliography

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