Clinical History

- 61-year-old man with history of non-arteritic ischemic optic neuropathy (NAION) resulting in legal blindness, who presented with 6 month history of radiating lower back pain and leg weakness
- Significant lower extremity, distal-predominant weakness on exam
- Abnormal CSF studies
  - Elevated protein and persistent lymphocytic pleocytosis
  - Positive West Nile Virus IgG/IgM
- EMG/NCS showed evidence for bilateral radiculopathies
Serial Imaging Studies

6/2017

10/2018
A biopsy of the L5/S1 spinal nerve root was performed.
Discussion

- Differential diagnosis?
- Additional studies?
Patient revealed that he received intrathecal and intravenous stem cell transfusions in China and Russia for the purpose of restoring his sight.
UCSF500 Molecular Analysis: Paired lesional tissue and germline sequencing

- No chromosomal gains, losses, focal amplifications or deletions
- No known pathogenic variants including hotspot mutations important in glioma pathogenesis
- ~90 nonsynonymous variants present in aberrant glioneuronal tissue but not in germline sample
- Vast majority are single nucleotide polymorphisms (SNPs) common in human populations
  - Allele frequencies of 20% or 40% likely representing heterozygous and homozygous SNPs
Final diagnosis: L5-S1 Nerve Root Biopsy

Donor-derived glioneuronal proliferation following intrathecal stem cell injection
Donor-derived stem cell glioneuronal lesions
5 previously reported cases

- Age range 13-73
- International travel for intrathecal stem cell injections
  - China, Russia, Mexico, Israel, Argentina
- Protocols unclear but often involved stem cells of fetal origin
- Seeking treatment for variety of disorders
  - Residual deficits from ischemic infarcts
  - Parkinson’s disease
  - Ataxia telangiectasia

Common Features of Reported Cases

- **Intraoperative impression:**
  - “Noodle” or “tube-like” encasement

- **CSF abnormalities:**
  - Lymphocytic pleocytosis, increased protein

- **Low-grade glial or glioneuronal proliferation**
  - Low Ki-67 labeling index (4/5)
  - Associated chronic inflammatory infiltrate (3/5)
    - Host-derived in one case with microdissection

Common Features of Reported Cases

- Non-host origin was confirmed in 4 of 5 cases

- Variety of treatment strategies
  - Observation
  - Radiation
  - Methotrexate +/- radiation
  - Surgical debulking

Conclusions

- Stem cell therapies can provide hope to patients and potentially address previously untreatable diseases, but carry substantial risks.
- Donor-derived stem cell lesions are one possible complication of experimental stem cell interventions.
- Lumbosacral nerve roots seem to be a permissive environment for stem cell engraftment.
- Pathologists, radiologists and neurologists should be aware of this rare but increasingly reported adverse outcome.
References


