Stem Cells mobilized by Hyperbaria

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BACKGROUND

- Nominal hyperbaric room air has been anecdotally reported to be therapeutic for some pathologies
- There is a paucity of research investigating the therapeutic value of nominal hyperbaric air.
- Hyperbaric oxygen (HBOT) mobilizes endothelial stem progenitor cells [1]
- Previous research in our lab found that normobaric 42% oxygen mobilizes stem progenitor cells in a rat model

METHODS

- We asked the question: Does nominal hyperbaria mobilize stem progenitor cells?
- We hypothesized that nominal hyperbaria would mobilize stem progenitor cells
- N=10
- 1.27 ATA Room Air for 1.5 hours per day
- Tx 10 days over two weeks – no weekends
- Blood samples drawn:
  - before 1 tx – control
  - after 1 tx
  - before 10th tx
  - 72 hrs post 10th tx

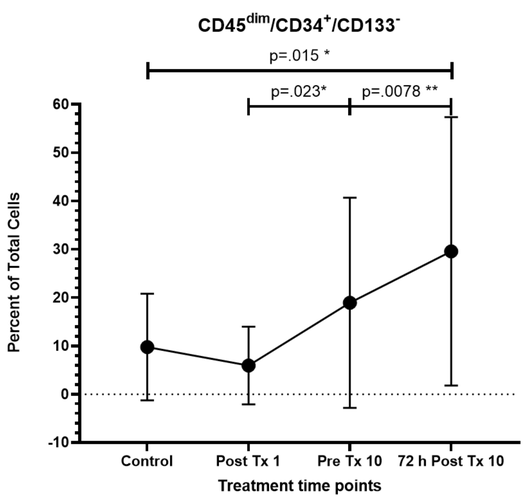
Subjects were own controls

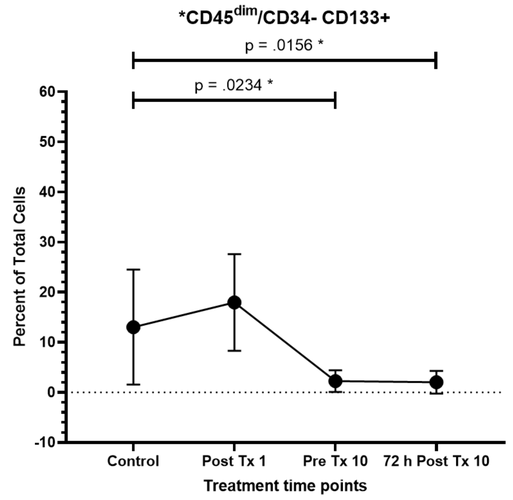
Single Blind – Carbone Cancer Center staff gated flow cytometry analysis

- (1.27 ATA (4psig) = PiO_2 = 190 Torr and PiN_2 = 706 Torr)

Daily, Intermittent Nominal Hyperbaria Mobilizes Stem Progenitor Cells

RESULTS





Mean CD45dim/CD34+/CD133- and CD45dim/CD34-/CD133+ populations at 4 study time points expressed as a percentage of total lymphocytes. Control = before 1st treatment, Post Tx 1=immediately after 1st treatment, Pre Tx 10=immediately prior to 10th treatment, 72 h Post Tx10=3 days after 10th and final treatment. P values displayed are Wilcoxon signed rank test post hoc of Friedman's nonparametric test. Treatment at:

CONCLUSIONS

- A small increase in barometric pressure given intermittently over a two week period mobilizes stem progenitor cells in a manner that is similar to Hyperbaric Oxygen Therapy.
- Hyperbaric air is much less expensive and has a lower risk of oxygen toxicity. These factors could prove useful for some of the 14 indications approved for HBOT in places and populations where HBOT is not available such as rural areas, developing nations and conflict areas.

ADDITIONAL KEY INFORMATION

1. Thom, S. R., et al. (2006). "Stem cell mobilization by hyperbaric oxygen." Am J Physiol Heart Circ Physiol **290**(4): H1378-1386.
2. MacLaughlin, K., et al. (2019). "Effect of intermittent hyperoxia on stem cell mobilization and cytokine expression." Medical Gas Research 9(3): 139-144.

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