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INFLUENCE OF ALTITUDE ON RISE OF HEMATOCRIT IN PATIENTS RECEIVING TESTOSTERONE THERAPY: THE LOW T EXPERIENCE

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BACKGROUND

- We hypothesize that there is varying response of serum testosterone (T) and hematocrit (Hct) to similar doses of injectable testosterone cypionate based on the altitude of the patient.
- The 50 Low T Centers are distributed across the United States at various altitudes and follow similar strict protocols.
- A comparison was made of selected Centers from different altitudes.

MATERIALS & METHODS

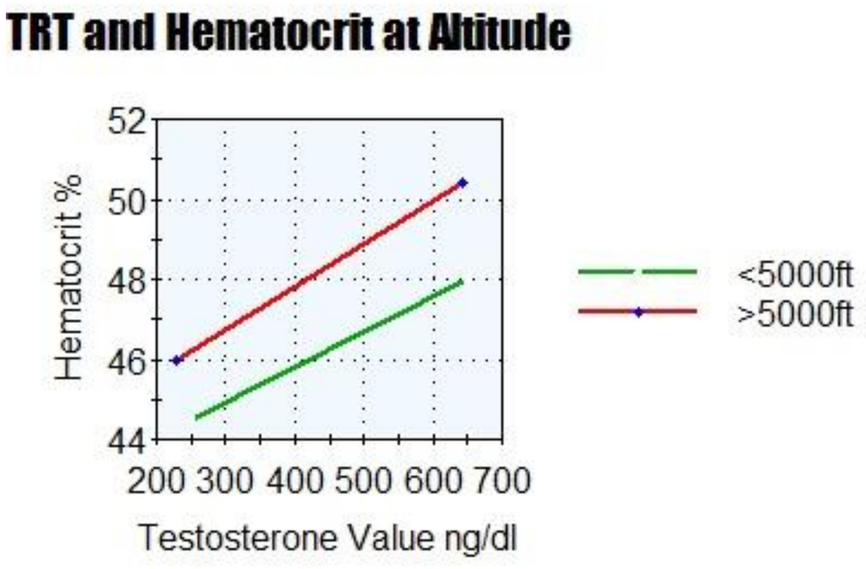
- In this pilot study, we selected 7 centers of which 3 centers in Colorado (>5000ft) were compared to 4 centers (Plano, Houston, Nashville, Las Vegas) in lower altitudes (<5000ft).
- IRB approval was sought and data was mined from the EMR (Advanced MD) with patient information de indentified. Randomization was based on selection of last name by a fixed alphabetical order in the different centers.
- Data was entered into Excel, and the statistical analysis performed using Graphpad QuickCalcs. The statistical significance of between-cohort differences in categorical variables was tested using the chi-square test and in continuous variables using the two-sample t-test. All tests were two-tailed with a significance level of $p < 0.05$.

Entering Higher Altitudes: Colorado Rockies

RESULTS

- 160 patients were analyzed, with equal distribution to >5000 ft (n=80) and <5000 ft (n=80) respectively.
- Of those, < 5000 ft mean initial total T= 250ng/dl and mean initial Hct=44.5. After 6 months of treatment, mean total T=649ng/dl and Hct =48.
- Of those >5000 ft mean initial total T= 230ng/dl and mean initial Hct=46. After 6 months of treatment, mean total T=644ng/dl and Hct =50.4.
- Unpaired t test was applied to the mean change of total T and Hct for both groups with different altitudes. The difference in change in Hct was statistically significant, p =0.01, C.I. -1.75 to -0.23. However, the difference in the change in total T was insignificant.

Phlebotomies after Testosterone Therapy more Frequent at Higher Altitudes



DISCUSSION

•Under standard protocols, equivalent doses of testosterone appeared to raise serum T to the same extent in different altitudes.

•However, the impact on Hct differs based on the altitude of the patient.

•The implication may be more frequent phlebotomies in higher altitude patients. In Colorado, one in 18 of our patients requires phlebotomy on a regular basis compared to about 1 in 30 patients in lower latitudes. A larger study is needed to confirm our preliminary findings.

CONCLUSIONS

- Our pilot work on 160 patients in a large data base of about 50,000 patients represents the first attempt to understand the differential responses to injectable testosterone at different altitudes.
- While the serum testosterone response with the same dose did not differ with respects to altitude, the hematological response did.
- Currently, there are no guidelines to for the threshold for phlebotomies at varying altitudes. We assume that a rise in hematocrit at a higher altitude has the same consequence as that at lower altitudes and thus subject our patients to more frequent phlebotomies at higher altitudes as compared to lower altitude patients.
- As such, more work is needed to determine if a different threshold can be accepted for higher altitude patients.

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