Blood Analysis in Athletes
בדיקות דם מומלצות בכרוניקה
בספורטאים
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Vignette:

16 year old female, professional triathlete in the national triathlon team, arrived to your clinic after a sport’s physician examination. The new team physician asked the patient, as well as the rest of the team, to do the following laboratory exams as a routine:

Erythrocyte sedimentation rate, complete blood count, electrolytes panel, CPK level, lactate level, lipid profile, vitamin profile and iron stores analysis.

Which of the above mentioned exams do you think is necessary for this patient?
Which of the above mentioned exams do you think is necessary for this patient?

1. ESR
2. CPK
3. Iron stores’ analysis
4. Electrolytes panel
Lab test in athletes - Any guidelines??

- There is very little data available on the inclusion of assessment for non-cardiac medical conditions in a PHE.

- Evidence for the inclusion of screening tests to identify non-cardiac medical conditions in a PHE is therefore largely limited to expert opinion and case series.

- From a public health perspective, there is insufficient evidence to date to mandate any specific screening tests for elite athletes apart from those recommended for the general population¹.
Routine Blood Analysis in Athletes

WELL. AGREE TO DISAGREE.
Screening in the healthy population²
Iron Deficiency Anemia in Athletes:


Screening blood tests in members of the Israeli National Olympic team.

Eliakim A¹, Nemet D, Constantini N.

RESULTS: Fifteen athletes (13%; 9 females, 6 males) had low ferritin levels (<20 ng/ml) indicating decreased iron stores. Four of these athletes (3.5%) had overt iron deficiency anemia. Two other athletes had B12 deficiency anemia. Three athletes had
Utility of hematological and iron-related screening in elite athletes.

Fallon KE¹.

**RESULTS:** Eight female athletes (4.6%) had clinically relevant abnormal results, 6 with an obvious explanation on clinical history and examination and 1 who was diagnosed with hemochromatosis following genetic testing. Eighty-nine (51.1%) female athletes had abnormal results that were not associated with obvious clinical signs or symptoms. Twenty-seven female athletes had a serum ferritin less than 30 ng/mL and were placed on iron supplementation. In male athletes, 5 cases had screening abnormalities that were associated with illness or other factors identified during the clinical consultations. Nonclinically significant abnormalities in males were generally minor reductions in hemoglobin and/or hematocrit or minor alterations in red cell parameters. Five male athletes had a serum ferritin less than 30 ng/mL and were placed on iron supplementation.
High prevalence of iron deficiency and anemia in female military recruits.

Dubnov G¹, Foldes AJ, Mann G, Magazanik A, Siderer M, Constantini N.

on lifestyle habits and menstruation was completed. Iron depletion (serum ferritin level of <20 microg/L) was found for 77% of study participants. Iron deficiency (ferritin level of <12 microg/L and transferrin saturation of <15%) was found for 15% of study participants. Anemia was found for 24% of subjects, and iron deficiency anemia was found for 10% of subjects. High prevalence
The main rationale for including routine hematological assessment is based on the higher than expected prevalence of decreased iron stores in athletes, particularly female athletes.

An additional rationale is to determine if the athlete has anemia (iron deficiency or other), and to identify other illnesses such as infections.

It is noteworthy that hematological testing has been suggested as a screening/monitoring tool for blood doping (hematological passport) as well.
Utility of hematological and iron-related screening in elite athletes.
Fallon KE.

- Full blood count and a serum ferritin on male athletes entering an elite training program. Further testing should be performed on clinical grounds.

- In females, the yield is greater.

- In view of their greater risk of iron depletion and to assess the effect of increased training inherent in elite programs, this could be repeated at 6-month intervals, or an isolated measurement of serum ferritin could be performed.
Participants: 100 elite athletes from 11 sports (56 male and 44 female athletes, mean age 19 years, range 16–27), undergoing routine medical screening.

Intervention: Initial and follow-up assessment of the following biochemical parameters in association with clinical assessment;
**Results:** 18 athletes showed no abnormalities on biochemical screening. 194 abnormal results were found in 82 athletes.

**Conclusion:** Most abnormalities found on routine biochemical screening in elite athletes are of no clinical significance, therefore such testing should, if used only for clinical purposes, be abandoned. When athletes are tested for iron status it would be prudent to include assessment of serum cholesterol in those with a family history of hyperlipidemia.
Thyroid disorders in athletes.

Duhig TJ, McKeag D.

• TSH, T3, T4???

• Thyroid hormones regulate gene transcription in relation to skeletal muscle.

• Presentation in athletes: Fatigue\decrease in exercise capacity\undesired weight change

• Nutritional supplements? Anabolic steroids? TBG, T3, T4?
• It is important for the clinician to exercise judgment in obtaining and interpreting laboratory values.

• Serial testing may be warranted if no cause was elicited.

• Pre participation screening for thyroid disease has not shown value to date and is not recommended at this time.
Keep in mind our patients opinion…

Blood tests in tired elite athletes: expectations of athletes, coaches and sport science/sports medicine staff

K E Fallon

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Percentages of each group expecting a history to be taken, an examination to be performed, a blood test to be taken or a scan performed</th>
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Take Home Message

• Recreational and elite training athletes should be screened for iron deficiency without anemia using serum ferritin, and Hb.$^{3,4}$

• Further testing should be performed on clinical grounds.$^{4}$

• Routine biochemical screening: such testing should be abandoned$^{5*}$. 

• Screening for thyroid disease has not shown value to date and is not recommended at this time.$^{6}$
References: