

Guidelines for the Use of Serum Tests for Iron Deficiency

1. Background

Serum ferritin, serum iron and total iron binding capacity (TIBC) are commonly ordered tests for the detection of iron deficiency. Serum ferritin has been demonstrated to be the superior test and little diagnostic utility is gained by adding the additional tests.

2. Limitations

In infection, inflammation and malignant disease, the serum ferritin level may be elevated and fail to reflect the body iron stores. In these same situations, the serum iron and TIBC are frequently reduced also rendering these test results invalid. The serum iron level is also affected by oral iron ingestion and fluctuations due to circadian rhythms.

3. Indications

Iron deficiency occurs with high prevalence in menstruating and pregnant females, adolescents and those on poor diets. It may also be an early indication of bleeding particularly from the gastrointestinal tract. Although various conditions may cause elevation of serum ferritin, it is still valid to order the test in these situations, although interpretation of the result will be more difficult.

The serum iron must be decreased and the TIBC increased before these two tests can be considered to indicate iron deficiency.

4. Recommendations

To detect iron deficiency the serum ferritin assay should be ordered alone. It is not necessary to order serum iron and iron binding capacity also.

5. Interpretation

Ferritin less than normal range = iron deficiency

Ferritin > 40 microgram/l = possible iron deficiency, lesser degree of confidence

Ferritin > 70 microgram/l = possible iron deficiency in patients with complicating conditions, moderate degree of confidence.

6. References

Guyatt GH, Oxmann AD, Ali M et al., Laboratory diagnosis of iron deficiency anemia: an overview. *J Gen Intern Med* 7, 145-153 (1992).

Finch CA, Huebers H, Perspectives in iron metabolism, *N Eng J Med* 306, 1520-1528 (1982).

N.B. Serum iron and TIBC as well as ferritin remain a valid combination of tests for investigation of iron overload, and in these circumstances the ordering physician should communicate the reason to the laboratory director.

The **Ontario Association of Medical Laboratories** acknowledges the review of this guideline by the Internal Medicine, Gastroenterology and Hematology/Oncology sections of the Ontario Medical Association.

The Ontario Association of Medical Laboratories

The Ontario Association of Medical Laboratories (OAML) represents the community-based laboratory sector in Ontario.

Its mission is to promote excellence in the provision of laboratory services and, as an essential component of the health care system, to contribute to shaping the future of health care in Ontario.

The OAML encourages the highest level of professional and ethical integrity and technical excellence among laboratory owners, operators and staff in the provision of laboratory services for the benefit of the people of Ontario.

Guidelines for Clinical Laboratory Practice

The OAML, through its Quality Assurance and Clinical Laboratory Practice Committee, co-ordinates the development and dissemination, implementation and evaluation of Guidelines for Clinical Laboratory Practice.

A proposed Guideline is developed by a working group of the Committee with the participation of outside experts. The proposed guideline is then submitted to the Committee as a whole and to a Professional Advisory Group who provide an overall review of the document. The comments of the Committee and the Professional Advisory Group are incorporated into a revision of the guideline and this draft is submitted to laboratory Medical Directors, professional associations and other representatives of end users for additional comment. The document is revised in light of these comments and submitted to the OAML Board of Directors for approval.

Approved guidelines are distributed to Community-based Laboratories and by them to their client physicians.

There may be additional educational materials produced, if it is thought that they might be useful, and these are distributed with the guideline.

The comments of end users are essential to the development of guidelines and will encourage adherence. You are strongly encouraged to submit your comments on this or on any other OAML Guideline to:

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