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Guidelines for the Use of Serum Tests to Detect Renal Dysfunction

1. Background

Serum creatinine and serum urea or blood urea nitrogen (BUN) are commonly ordered tests to detect renal dysfunction. Creatinine is the end product of creatine metabolism in muscle. Its formation and serum concentration are relatively constant. Urea is the end product of protein metabolism and its production and concentration vary with protein intake, enhanced tissue breakdown due to hemorrhage, trauma or use of corticosteroids and in liver disease.

2. Limitations

Serum urea concentration is a less specific indicator of glomerular function than is serum creatinine. While a decrease in glomerular filtration rate (GFR) is associated with increases in both serum urea and serum creatinine, serum urea concentrations may vary independent of the GFR. A rise in serum creatinine concentrations almost always represents a reduction in GFR.

As muscle mass may be reduced in the frail, malnourished or extremely elderly, creatinine production may be correspondingly reduced; serum creatinine may not rise above the standard reference range even as the GFR is reduced.

3. Indications

In specific clinical situations, listed below, selective ordering of serum urea alone or of serum urea and creatinine simultaneously may be indicated:

- acute renal failure
- prerenal failure
- renal dialysis
- chronic renal failure
- GI bleeding
- drug interference
- hyperosmolar conditions
- nutritional status

4. Recommendations

Serum creatinine should be used routinely to assess glomerular function. Routine ordering of serum creatinine and serum urea simultaneously is not recommended. Selective ordering of serum urea alone or of both serum urea and serum creatinine is useful in the appropriate clinical setting.

5. References

Woo, J, Cannon D. Metabolic intermediates and inorganic ions; Henry, JB ed. *Clinical Diagnosis and Medical Management by Laboratory Methods*, W. B. Saunders, Philadelphia, 1991, pp.140 -143.

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Cockcroft DW, Gault MH, Prediction of Creatinine Clearance from Serum Creatinine, *Nephron*, 1976; 16: 31-41.

6. Acknowledgments

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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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