Pseudohypocalcemia with MR Imaging Contrast Agents

Two of the four approved gadolinium based magnetic resonance (MR) imaging contrast agents, gadodiamide (Omniscan) and gadoversetamide (OptiMARK), have recently been shown to interfere with calcium measurements on some chemistry analyzers, resulting in falsely low values. Patients with normal renal function may have spuriously low calcium measurements up to 24 hours after administration of these contrast agents, but patients with renal insufficiency may be affected for up to 4.5 days. However, the Vitros chemistry analyzers used throughout the Saint Luke’s Health System are not adversely affected (Am J Clin Pathol 2004;121:282-92).

Intraoperative Parathyroid Hormone

Primary hyperparathyroidism affects approximately 1 in 700 people. Surgery is currently the only curative therapy for parathyroid adenoma and hyperplasia. Typically there are 4 glands, but 2-6% of individuals have more than 4 glands and some individuals may have as many as 12 glands. Approximately 15% of patients have parathyroid glands in ectopic locations such as the thymus, perithymic tissue, and thyroid nodules. The most common cause of unsuccessful parathyroid surgery is failure to recognize multiglandular disease, which has a reported incidence of 8 to 35%. Multiglandular disease occurs most frequently in patients with multiple endocrine neoplasia (MEN) type 1, familial hyperparathyroidism, and secondary hyperparathyroidism. Missed multiglandular disease necessitates reexploration, which has a substantially increased risk of complications such as permanent hypoparathyroidism and recurrent laryngeal nerve paralysis.

Rapid intraoperative PTH assays have been introduced to assist in determining when all hyperfunctioning parathyroid tissue has been resected. The half-life of PTH varies between 2 and 5 minutes. Therefore, removal of an abnormal gland can be assessed by a decrease in plasma PTH within 10 minutes after resection. A typical intraoperative PTH protocol involves the following steps.

1. **Induce Anesthesia**
2. **Draw Baseline PTH Level**
3. **Isolate Enlarged Parathyroid Gland**
4. **Draw 2nd PTH Level**
5. **Remove Parathyroid Gland**
6. **Wait 10 Minutes**
7. **Draw Postresection PTH Level**

A decrease in the post-resection PTH level of >50% compared to the baseline or second sample indicates that all abnormal parathyroid tissue has been removed. A lesser decline indicates that further exploration is warranted. An example of a successful resection is illustrated below.

![Graph of PTH vs Specimen Number](image-url)
Saint Luke’s Hospital laboratory will begin offering intraoperative PTH in May. This service will be available Monday through Friday. Mornings are preferred. Surgery needs to notify the laboratory the day before the procedure to schedule testing. Specimen requirement is one lavender top tube of blood. The tube needs to be completely filled with blood, because excess EDTA anticoagulant may interfere with PTH measurement. Specimens should be placed in a cup of ice and immediately transported to the laboratory. Results will be called to the operating room and reported in the laboratory information system.

**Screening for Von Willebrand Disease & Platelet Function Disorders in Patients with Menorrhagia**

Unexplained menorrhagia is a common clinical problem among women of reproductive age, and is the presenting symptom for the majority of hysterectomies performed in the USA. Approximately 20% of hysterectomies are performed for “dysfunctional” uterine bleeding, not attributable to a specific diagnosis. Recent studies have indicated that there is a high incidence of hemostatic disorders among women with menorrhagia. Von Willebrand disease (VWD) is the most common hereditary disorder of hemostasis, affecting approximately 1% of individuals worldwide, and has been reported to be present in 6-20% of women with menorrhagia. Menorrhagia is the most common bleeding symptom in females with VWD, occurring in 93% of adult women with the disease, and is the initial bleeding symptom with onset at menarche in 51% of cases. Platelet function defects are also common in this group of patients – in one study platelet aggregation defects were identified in 47% of women with unexplained menorrhagia; in another study an inherited platelet function disorder was diagnosed in 13% of women with menorrhagia.

In spite of this data, women in the USA with unexplained menorrhagia are rarely evaluated for inherited bleeding disorders. In a recent survey of 1,444 women conducted on behalf of the National Hemophilia Foundation, 10% reported that their periods lasted more than 7 days, and 33% reported their menstrual flow as heavy, however not one of these women was diagnosed with VWD. In another recent survey, 376 US gynecologists reported that 8% of their patients complained of menorrhagia; however only 4% of the physicians considered a diagnosis of VWD for women of reproductive age, and only 16% considered this diagnosis in girls around menarche. The American College of Obstetricians and Gynecologists (ACOG) Committee on Gynecologic Practice made the following recommendation in 2001: “Inherited and acquired disorders of coagulation and hemostasis should be considered in the differential diagnosis of menorrhagia and abnormal uterine bleeding”. Prompt diagnosis of VWD or a platelet function defect in women with menorrhagia would lead to appropriate and effective management of bleeding, and avoidance of unnecessary surgery.

A comprehensive diagnostic workup for bleeding disorders can be complex and expensive, however a new convenient screening test is now available for in vitro evaluation of platelet function. This test, known as the platelet function screen or PFA-100®, is highly sensitive for diagnosis of VWD (88-100% sensitive) and platelet function disorders (>90% sensitive). If a normal result is obtained further testing is usually not indicated. If an abnormal result is obtained further laboratory testing is indicated (VWD panel and platelet aggregation). In a recent evaluation of this assay in women with menorrhagia, the authors concluded that this test offers a simple and relatively inexpensive way to screen for underlying bleeding disorders. The platelet function screen is available at Saint Luke’s Regional Laboratories 7 days a week, 8am – 8pm. One 5mL sodium citrate (light blue top) tube is required. The sample must be received by the laboratory within 3 hours of collection. Further details about the platelet function screen can be found in the December 2003 edition of Clinical Laboratory Letter.

**Urine Protein Reference Range Change**

The reference range for 24 hour urine protein has been changed from 0-150 mg/24 hours to 0-225 mg/dL. The reference range for the protein:creatinine ratio has been changed from 0-100 mg/g to 0-15 mg/g.

**CA-125 Method Change**

In April, the method for measuring CA-125 was converted from a manual radioimmunosassay to an automated chemiluminescent immunoassay. Testing will now be performed 6 days per week and results will be available the same day. During the first 3 months of this conversion, results from both methods will be reported to allow more accurate trending of serial measurements.