Urinary Cytology

Objective: To establish optimal collection and processing procedure for voided urine samples for cytologic evaluation.

Method: Voided urine samples have been used for decades as a major diagnostic laboratory procedure. Basic urinalysis, glucose, blood, toxicology, and other chemical components are detectable and quantitated from modern urine samples. Recently, Immunocytochemical, FISH, genetic and other esoteric tests have been developed and validated from urine samples.

Cytology: Urine has long been used as a screening tool for bladder cancer. Recent advances in slide preparation technologies, UrClear along with the development of tumor markers and DNA specific probes have added prostate and kidney as cancer screening sites. Because voided urine is hypacellular, it has been generally accepted that sensitivity has been limited to High Grade Transitional Cell Carcinoma or higher in routine urine cytology. It was considered a late stage screening procedure, and many clinicians do not currently consider urine cytology as a reliable screening test for early detection of bladder cancer. Recent advancements in slide making technology along with a better understanding of optimal
sample collection and fixation have markedly increased the sensitivity and reliability of the test.

Another factor that has had a negative outcome on many urine cytology specimens is associated with the traditional work flow of the laboratory. In the past, most urine samples collected either in the hospital setting or in the clinicians’ office, were shared among several laboratory departments. The usual process is that the sample would first be processed for routine urinalyses, and this requires that the sample be unfixed. The urinalyses testing could take from a few hours to a few days, and by the time the specimen reached the cytology department, it was compromised by volume reduction and by degradation due to non-preservation. Optimal testing for urine cytology specimens require the complete volume of voided urine, and that the specimen be immediately refrigerated or properly stabilized by adding an appropriate amount of a fixative solution that is specific for urine. The most convenient method to accomplish this, and insure consistent results, is to
premeasure and package the collection container and fixative solution together, with simple, easy to understand instructions. As seen in the examples below, the fixative solution can be placed together inside the actual collection cup, and added to the sample after collection. It is important that the fixative solution is not in the container at the time of collection.

The patient should be instructed to void directly into the cup. Most patients who are at risk for bladder cancer will have an average voided volume of less than 150 ml, so a 200 ml container is an ideal size for this sample collection. The corresponding volume of fixative will be 80 ml. If the collected urine sample is greater than 80 ml, (the container will mark 80 ml) the specimen should be allowed to settle, and then the top of the specimen is gently poured off to reach the 80 ml mark. The fixative solution is then added to the specimen. This produces a 1/1 ratio of specimen and fixative solution, and the
specimen is now stable for 48-72 hours pending processing in the laboratory.

When the specimen is collected in this manner, refrigeration is not necessary, but may provide a slight improvement in the fixation process, if refrigeration is readily available and convenient, it is recommended.

The implementation of these guidelines will produce highly cellular, well fixed urine cytology slides that will allow visualization of cellular morphology adequate to dramatically increase interpretation sensitivity and specificity. The added benefits of the availability and feasibility of reflex and secondary FISH, IHC, or other molecular testing, offer significant improvements in patient care and test utilization.

By utilizing optimal collection, preservation and slide preparation, urine cytology can be a valuable and reliable diagnostic aid for practitioners, and a practical application to patient care.