Marissa Hill
8/5/20
A&P II

Urinalysis LAB Report

Introduction:

The primary function of the kidneys is to maintain homeostasis for optimal cell and tissue metabolism through the excretion of waste products. Kidneys regulate blood volume, secrete hormones, regulate PH of blood in conjunction with the respiratory system. In cases of extreme starvation they carry out gluconeogenesis and even synthesize calcitriol to contribute to calcium homeostasis. Urinalysis plays a major role in assessing overall health of an individual. Urine samples taken at yearly checkups is common practice and can give great insight into arising health issues. After performing this experiment we should have a better understanding of the normal constituents that are in urine and be able to identify pathology when a specimen has a solute that should not be present. Common conditions include, calculi, casts, albuminuria, glycosuria, hematuria, hemoglobinuria, ketonuria and pyuria.

The color of urine should be pale yellow. This color is due to urochrome that arises as a result of the breakdown of hemoglobin. The lighter the color, the less concentration of solutes. If the urine has a darker color, it has an increase in the volume of solutes relative to water. Urine has a specificity gravity ranging from 1.001 to 1.030. The PH of urine ranges from 4.5-8.0 with the average slightly more acidic. A bacterial infection can cause the PH to become more alkaline. Another sign of bacterial infection is urine with a strong ammonia-like odor and fruity smelling urine can be an indication of uncontrolled diabetes mellitus.

Materials and Methods:

Disposable gloves, urine samples to include some with pathological specimens, PH paper, Dipsticks, Urometer, test tubes, 10ml graduated cylinders.

Normal Artificial Urine:

There were no underlying conditions. This would most likely be the sample of a healthy person. All tests came back negative, the only positive which you would see in any urine analysis of normal urine is the specific gravity. This is due to the normal amount of solutes contained within the urine.

Abnormal artificial urine sample 1:

In the abnormal artificial urine sample one color on the dipstick is very distinct. The purple/maroon color indicates ketones within the urine. This positive test finding is closely linked to uncontrolled type 1 diabetes mellitus, starvation, or any situation producing stress. Insulin deficiency causes lipolysis(the breakdown of fat) for energy. This is followed by formation of the beta- hydroxbutyric and acetoacetic acids that produce ketones in urine that send the patient into diabetic ketoacidosis. It can also be observed that the dipstick has a lower PH. This makes sense because production of ketone bodies will drop the PH resulting in metabolic acidosis. The respiratory system will compensate with kussmaul respirations in an attempt to increase the blood PH.

Abnormal artificial urine sample 2:

Five drops of urine were placed into a test tube followed by 10 drops of water. A clinitest tablet was dropped into the tube and color was compared to the color chart. It can be observed that there is a brown color indicative of glucose in the urine. In normal healthy urine samples glucose is not present because glucose is typically reabsorbed by the proximal convoluted tubule. The contributing factors for glucose in the urine are type 2 diabetes and renal failure. In type II diabetes insulin is not able to drive the glucose into the cell or there is too much intake of carbohydrates that are excreted as glucose in the urine.

Conclusion:

After careful observation of the dipsticks. It can be concluded that the use of a urine sample can determine certain pathologies of an individual. Glycosuria is commonly seen with high sugar levels because of inadequate insulin levels or resistance to insulin and kidney failure.

Protein which is a negative charged metabolite that is reabsorbed by the proximal convoluted tubule will be detected in urine if there is any inflammation from antigen antibody complexes that increase membrane permeability and reduce the glomerular membrane surface area. When the protein is lost there is also a loss of negative electrical charge and this increases the filtration pore size to allow protein in the urine.

Ketones are a result of lipolysis in which the body looks for other sources of energy other than carbohydrates. It will start breaking down fat and protein. The increase in fat metabolism results

in an acidic blood PH which the respiratory system must try to bring to homeostasis with kussmaul respirations to increase the PH and blow off CO2.

Hematuria can be seen in glomerular disorders, one in particular is nephritic syndrome. As with protein, damage or inflammation due to autoimmune diseases, toxin exposure, drugs, vascular disorders and infection can increase glomerular membrane permeability and reduce glomerular membrane surface area. The pore size for filtration increases allowing for hematuria with blood cell casts.

If there is a positive for increased bilirubin further investigation would be needed to find the cause. Gallstone can block the bile duct, damage to the liver from hepatitis and pyelonnephritis can also cause an increase in bile pigments.

A positive for nitrites can be seen when bacteria from a UTI such as E. Coli reduce nitrates to form nitrites. This would most likely also result in positive finding for leucocytes, as with any infection WBC count would increase and the product produced is pus. In the urine it would be pyuria.

Overall, there is a tremendous amount of information that can be concluded from a urinalysis test. This allowed for better understanding of why urine specimens are taken at a yearly check up. Most importantly, we should now have a better understanding of how diagnosis for common health issues are conducted and interpreted.