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Urine Microscopic Examination is a laboratory test used to examine the physical, chemical, and microscopic characteristics of urine. The test helps to detect any abnormalities in the urine, which may indicate underlying health conditions. The procedure involves analyzing a small sample of urine under a microscope, which allows the technician to view the cells, bacteria, crystals, and other substances present in the urine. Urine microscopic examination is a laboratory test that analyzes a small sample of urine under a microscope to evaluate the physical, chemical, and microscopic characteristics of the urine. It helps to diagnose various health conditions, such as urinary tract infections, kidney disease, and bladder cancer. The test involves analyzing the color, clarity, pH, and specific gravity of the urine and identifying the type and number of cells, bacteria, and other substances present in the urine. Abnormal findings may indicate an underlying health condition.Here are some of the purposes of urine microscopic examination:Diagnose Urinary Tract Infections (UTIs): The test is used to identify bacteria, white blood cells, and other substances that indicate the presence of a UTI.Diagnose Kidney Diseases: The presence of red blood cells, white blood cells, and other substances in the urine can indicate kidney damage or disease.Monitor Kidney Function: The test can be used to monitor the progress of kidney disease and assess the effectiveness of treatment.Screen for Bladder Cancer: Abnormal cells in the urine may indicate the presence of bladder cancer.Evaluate Kidney Stones: The presence of crystals in the urine can indicate the formation of kidney stones.Diagnose Metabolic Disorders: The presence of glucose, proteins, and other substances in the urine can indicate metabolic disorders such as diabetes or proteinuria.Monitor Pregnancy: The test can be used to monitor the health of pregnant women and identify potential complications such as preeclampsia.Evaluate Autoimmune Diseases: The presence of antibodies in the urine can indicate autoimmune diseases such as lupus or glomerulonephritis.Overall, urine microscopic examination is a versatile and useful diagnostic tool that can provide important information about the health of the urinary system and the presence of various health conditions.Here are some reasons why urine microscopic examination may be ordered by a healthcare provider:To diagnose a urinary tract infection (UTI)To diagnose kidney diseaseTo monitor kidney functionTo screen for bladder cancerTo evaluate kidney stonesTo diagnose metabolic disorders, such as diabetes or proteinuriaTo monitor the health of pregnant women and identify potential complicationsTo evaluate autoimmune diseases, such as lupus or glomerulonephritisTo monitor the effectiveness of treatment for various health conditionsTo assess the risk of kidney damage from certain medications or medical conditionsTo evaluate the health of the urinary system in people with chronic conditions, such as hypertension or diabetesTo identify potential kidney problems in people with a family history of kidney diseaseTo assess the risk of developing kidney disease in people with risk factors, such as high blood pressure or diabetes.Overall, urine microscopic examination is a useful diagnostic tool that can provide valuable information about the health of the urinary system and the presence of various health conditions. It can help healthcare providers make an accurate diagnosis, monitor the progress of treatment, and identify potential complications.Here are some situations where a healthcare provider may order a urine microscopic examination:If a person is experiencing symptoms of a urinary tract infection (UTI), such as painful urination, frequent urination, or blood in the urine.If a person is experiencing symptoms of kidney disease, such as swelling in the legs, fatigue, or high blood pressure.If a person is being monitored for kidney disease, to assess the progress of the disease or the effectiveness of treatment.If a person has risk factors for kidney disease, such as high blood pressure, diabetes, or a family history of kidney disease.If a person is being monitored for bladder cancer, to assess the effectiveness of treatment or to screen for recurrence.If a person has a history of kidney stones or is experiencing symptoms of kidney stones, such as pain in the back or side.If a person is pregnant and needs to be monitored for potential complications, such as preeclampsia.If a person is being evaluated for an autoimmune disease, such as lupus or glomerulonephritis.If a person is being monitored for the effects of certain medications on the kidneys.If a person is being evaluated for a metabolic disorder, such as diabetes or proteinuria.Overall, a urine microscopic examination may be ordered in various situations where a healthcare provider needs to assess the health of the urinary system or diagnose certain health conditions.The sample required for a urine microscopic examination is a midstream clean-catch urine sample. Here are the steps for collecting this type of sample:Wash your hands thoroughly with soap and water.Clean your genital area with a cleansing wipe or towelette provided by your healthcare provider. Wipe from front to back to avoid contaminating the sample with bacteria from the anus.Start to urinate into the toilet bowl.After a few seconds, place a sterile collection cup under the stream of urine. Be careful not to touch the inside of the cup with your hands.Collect about 30 to 60 milliliters of urine, or the amount specified by your healthcare provider.Remove the cup from the stream of urine and finish urinating into the toilet bowl.Replace the lid on the collection cup.Wash your hands thoroughly with soap and water.Label the collection cup with your name, date of birth, and the date and time of the collection.Deliver the sample to the laboratory or healthcare provider as soon as possible. If you cant deliver it immediately, store it in the refrigerator until you can.Overall, collecting a clean-catch urine sample is important to ensure that the sample is not contaminated with bacteria from the genital area, which could affect the accuracy of the results of the microscopic examination.Random sample: This is a diluted urine sample and may give an inaccurate interpretation of patient health.But is best to do microscopy to evaluate WBC or RBC.First Morning sample: This is the best sample for microscopy and urine analysis. This is the concentrated urinebecause of urine remained throughout the night in the urinary bladder. This will contains an increased concentration of analytes and cellular elements. Urine must have remained in the bladder for 8 hours is considered as the first-morning sample.Urine for sugar (Postprandial 2 hours): Postprandial 2 hours sample collected after 2 hours of high carbohydrate diet.Midstream clean catch urine: This sample is needed for the culture and sensitivity of urinary infection. The patient is advised to clean the urethra, then discard the first few mL of urine. Now midstream of the urine is collected in the sterile container.24 Hours of a urine sampleIn this case, discard the first urine and note the time.Now collect urine in the container for 24 hours and put the last sample in the container.Refrigerate the sample.This 24 hours samples are needed for measuring urea, creatinine, sodium, potassium, glucose, and catecholamines.Suprapubic collection of the urine sample: This is done in the patients who cannot be catheterized and the sample is needed for culture. This sample is collected by the needle.Catheter collection of urine: This is done by patients who are bedridden and can not urinate.Pediatric urine sample: In infants, special collection bags are madeadherent around the urethra. Then urine istransferredto a container.The following are some of the tests that may be included in a urine microscopic examination:Urine sediment analysis: This test involves examining a urine sample under a microscope to look for cells, bacteria, crystals, and other substances that may indicate a urinary tract infection or other health condition.Red blood cell (RBC) count: This test measures the number of red blood cells in a urine sample, which may be elevated in cases of kidney stones, bladder cancer, or other urinary tract disorders.White blood cell (WBC) count: This test measures the number of white blood cells in a urine sample, which may be elevated in cases of urinary tract infections or other inflammatory conditions.Epithelial cell count: This test measures the number of epithelial cells (cells from the lining of the urinary tract) in a urine sample, which may be elevated in cases of bladder cancer or other urinary tract disorders.Bacteria and yeast culture: This test involves growing bacteria or yeast from a urine sample to identify the specific type of microorganism causing an infection.Crystals analysis: This test involves identifying crystals that may be present in a urine sample, which can provide information about the pH and composition of the urine and may indicate the presence of kidney stones or other urinary tract disorders.Casts examination: This test involves examining a urine sample under a microscope to identify casts (structures made of proteins or other substances), which may be present in cases of kidney disease or other urinary tract disorders.Overall, the specific tests included in a urine microscopic examination may vary depending on the healthcare providers reason for ordering the test and the patients individual health situation.The significance of a urine microscopic examination includes:Detecting Urinary Tract Infections: A urine microscopic examination is used to detect the presence of bacteria, white blood cells, and other indicators of a urinary tract infection.Evaluating Kidney Function: The test can help to identify the presence of casts, red blood cells, and other substances in the urine, which can be useful in evaluating kidney function.Diagnosing Certain Kidney Disorders: Urine sediment analysis can detect the presence of proteins, casts, and other substances that may indicate certain kidney disorders, such as glomerulonephritis.Monitoring Certain Medical Conditions: The test can be useful in monitoring certain medical conditions, such as diabetes, which can affect kidney function and urine composition.Detecting Pregnancy: A urine microscopic examination can detect the presence of hCG, a hormone produced during pregnancy, which can confirm the presence of a pregnancy.Assessing Urinary Tract Stones: The test can detect the presence of crystals, which may indicate the formation of urinary tract stones.Overall, a urine microscopic examination is a valuable diagnostic tool that can provide important information about a persons urinary tract health and kidney function. The test can be used to detect and diagnose a variety of medical conditions, monitor treatment progress, and help healthcare providers make informed treatment decisions.Here is a table of normal urine findings: Characteristic NormalColorPale or yellow Appearance ClearOdorMildly aromaticVolume1200 to 2000 ml/24 hourspH5 to 7Specific gravity1.001 to 1.035Cast (hyaline)0 to 5 / HPFRed blood cells 3 / HPFBloodNegativeRarely 2 to 3 RBCs/HPFWhite blood cells2 to 5 HPFMale = 1 to 2 /HPFFemale = 0 to 5 /HPFSquamous epithelial cells 15 to 20 / HPFYeastNegativeBacteriaNegativeProteinNegativeGlucose Random sample = Negative24 hours sample = 1 to 15 mg/dLKetones Urine = NegativeBilirubin Negative(o to 0.02 mg/dL)Urobilinogen NegativeRandom sample= =10^3 CFU/mL of Escherichia coli or Staphylococcus saprophyticus )With respect to adults in primary care:*Of note is that an MSU is indicated in ALL over 65 year olds if symptomatic and antibiotic given*Reference:Public Health England. Urinary tract infection: diagnostic tools for primary care. A quick reference tool for primary care for consultation and local adaptation. Last updated May 2024. (online)Usually, you dont have to do anything to prepare for a urinalysis. You may need to drink an extra glass of water if you dont feel like youll be able to pee for the test. But drinking too much extra water can give inaccurate results.Let your provider know:If youre currently getting your period (menstruating). Menstrual blood and vaginal discharge can interfere with certain urinalysis test results.If you have trouble peeing away from home, or shy bladder syndrome. They can give you options for providing a sample thatll be comfortable for you.In certain circumstances, your provider might ask you to:Get the sample from your first pee in the morning.Avoid certain foods before the test.Stop taking certain medications that can affect the results. Only stop taking medications if your provider tells you to.What happens during a urinalysis?In most cases, youll provide a pee sample at your healthcare providers office or at a laboratory using the clean catch method. You or your healthcare provider can also collect a urine sample using a catheter (thin tube).For the clean catch method, your provider will give you a specimen cup, sterile wipes and specific instructions for collecting your urine sample. Your provider will tell you what to do with your sample after youve collected it. Its important to wash your hands with soap and water before you collect the sample.Collecting a clean catch urine sample if you have labiaIf you have labia, collect your pee with the following steps:Start by sitting on the toilet with your legs spread apart.Using two fingers, spread your labia open. Use one sterile wipe to clean the inner folds of your labia, wiping from front to back.Use another sterile wipe to clean the opening to your urethra, where pee flows out of your body.Pee a small amount into the toilet.Stop the flow of pee and hold the specimen cup a few inches away from your urethra.Pee into the cup until its about halfway full or to the amount your provider recommends. Its OK if you cant fill it quite to halfway.Finish peeing into the toilet (if you need to).Collecting a clean catch urine sample if you have a penisIf you have a penis, collect your pee with the following steps:Use a sterile wipe to clean the head of your penis. If your penis is uncircumcised, first pull back your foreskin to ensure a thorough cleaning.Pee a small amount into the toilet.Stop the flow of pee and hold the specimen cup below your penis.Pee into the cup until its about halfway full or to the amount your provider recommends. Its OK if you cant fill it quite to halfway.Finish peeing into the toilet (if you need to).Collecting a urine sample with a catheterA healthcare provider can also collect a urine sample with a catheter. Theyll clean the area around the opening of your urethra with a germ-killing (antiseptic) solution and insert a catheter into your urethra. Your pee will drain into a sterile container and your provider will remove the catheter.What happens after a urinalysis?Your healthcare provider will send your sample to a lab for the urinalysis. In some cases, your provider may examine the sample and run dipstick tests on it immediately in their office. There is not a single urine test. There are several.In this article, we will describe 3 important urine tests, and give their normal values.Urinary dipstickColour StrawTurbidity ClearpH = 4.5-8. This is a wide range. But urine is normally acidic (i.e. 5.5-6.5) due to metabolic activity. But a very alkaline urine (pH >9.0) may be associated with a UTISpecific Gravity (SG) -1.003-1.030Protein NegativeGlucose NegativeKetone NegativeBilirubin NegativeUrobilinogen = 1.7-30 mol/LBlood NegativeLeucocyte (WC) NegativeNitrite NegativeUrinary ACR (marker of protein in urine) Categories (levels) of albuminuriaA1= 30. Moderate-to-above albuminuria>100 = nephrotic range. Then there needs to be a good reason not to do a kidney biopsy>220 = nephrotic syndromeMidstream specimen of urine (MSU; urine microscopy, i.e. looking at the urine under the microscope)White cells (WC)