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QUESTION 1

You are called to see a newborn in the nursery because the nurse is concerned that the baby may have Down syndrome.

If you were to perform an abdominal x-ray, what is the most likely finding that would be seen?

A. "double-bubble" sign

B. scimitar sign

C. normal gas patterns

D. free fluid in the abdomen

E. pneumatosis intestinalis

Correct Answer: A Section: (none)

Explanation:

The most common finding in a newborn with Down syndrome is hypotonia. Other common findings include single palmar crease, flat facial profile, macroglossia, and wide space between the first and second toes. Hypotonia in the newborn period should prompt close evaluation and follow-up. Café au lait spots are associated with neurofibromatosis. High arched palates are associated with fragile X syndrome. Ambiguous genitalia are commonly seen in CAH.

Children with Down syndrome are at an increased risk for hypothyroidism. It may be hard to detect without routine laboratory screening as they will commonly have mental retardation and developmental delay as part of their syndrome. Hypothyroidism may not be present in the immediate newborn period and requires, at a minimum, annual testing throughout the child\\'s life. The other findings listed are not specifically associated with Down syndrome. Lens dislocation is commonly found with Marfan syndrome or homocysteinuria. Children with Down syndrome have an increased prevalence of duodenal atresia. Pyloric stenosis is uncommon to see in the newborn period. It tends to present with nonbilious vomiting usually after 24 weeks of age. Hirschsprung disease (aganglionosis coli) presents with constipation and failure to pass stool. Infants with Hirschsprung disease commonly will not pass stool in the first days of life. Biliary atresia is a progressive cause of jaundice in an infant. It is the most common cause of a cholestatic jaundice in the newborn period. Emesis is not typically associated with biliary atresia. Milk protein allergy is a common cause of bloody stools in the first few months of life, but does not have bilious emesis associated with it.

QUESTION 2

A severely traumatized patient who has been receiving prolonged parenteral alimentation develops diarrhea, mental status changes, alopecia, and perioral and periorbital dermatitis. Administration of which of the following trace element is most likely to reverse these complications?

A. iodine

B. zinc

C. selenium

D. silicon

E. tin

Correct Answer: B Section: (none)

Explanation:

Symptoms of zinc deficiency include diarrhea, mental status changes, alopecia, and periorbital, perinasal, and perioral dermatitis. Persons who have cirrhosis, who are receiving steroids, who have excessive loss of GI secretions, or who are severely traumatized are at risk for zinc deficiency. Deficiency states resulting from inadequate ingestion of selenium, silicon, and tin have not been described. Deficiency of iodine produces hypothyroidism.

QUESTION 3

A 45-year-old male comes to your office for his first annual checkup in the last 10 years. On first impression, he appears overweight but is otherwise healthy and has no specific complaints. He has a brother with diabetes and a sister with high blood pressure. Both of his parents are deceased and his father died of a stroke at age 73. He is a long-standing heavy smoker and only drinks alcohol on special occasions. On physical examination, his blood pressure is 166/90 in the left arm and 164/88 in the right arm. The rest of the examination is unremarkable. He is concerned about his health and does not want to end up on medication, like his siblings. Regarding your initial recommendations, which of the following would be most appropriate?

A. You should take no action and ask him to return to the clinic in 1 year for a repeat blood pressure check.

B. You should immediately start him on an oral antihypertensive medication and ask him to return to the clinic in 1 week.

C. You should advise him to stop smoking, start a strict diet and exercise routine with the goal of losing weight, and return to the clinic in 6 months.

D. You should consider starting a workup for potential causes of secondary hypertension.

E. You should screen him for diabetes and evaluate him for other cardiovascular risk factors before proceeding any further.

Correct Answer: E Section: (none)

Explanation:

Although this is the first time that your patient has been noted to have an elevated blood pressure reading, given his family history and obesity, it is important to consider the coexistence of other cardiovascular risk factors. His evaluation should include, among other things, screening for DM and dyslipidemia along with an ECG. It is reasonable to ask the patient to submit himself to a strict diet (low in fat and salt) and to increase his exercise and activity, since these lifestyle modifications will likely result in weight loss, decreased blood pressure, and improve his risk profile for cardiovascular disease. Nonetheless, it is rarely enough to normalize blood pressure in all but the earliest stages of hypertension. Provided that no other comorbidities exist, the patient should return to clinic in no more than 2 months for a repeat blood pressure check. There is no need to consider secondary causes of hypertension, given his age and presentation.

You should not start antihypertensive medications until further evaluation is completed, and a second elevated reading confirms your diagnosis of hypertension. In the initial evaluation of hypertension (as per the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure [JNC-7], 2003), it is important to evaluate the patient for end-organ damage. This should include the heart, kidneys, eyes, and nervous

system. It is recommended to obtain a urinalysis to assess for proteinuria, glucosuria, or hematuria; to obtain an ECG to evaluate the heart for potential hypertrophy or early signs of cardiovascular disease; to obtain a fasting lipid profile, particularly after the age of 35, to assess the cardiovascular risk profile; and to check the patient\\'s renal function to assess for damage or dysfunction. Thyroid function tests are only indicated in the workup of secondary causes of hypertension. According to the JNC-7, this patient\\'s blood pressure falls into the stage 2 hypertension classification in which either systolic blood pressure (SBP) is at least 160 mmHg or diastolic blood pressure (DBP) is at least 100 mmHg.

Stage 1 hypertension is characterized by a SBP of 140159 mmHg and a DBP of 9099 mmHg. Prehypertension is characterized by a SBP of 120139 mmHg and a DBP of 8089 mmHg. Normal blood pressure is characterized by a SBP of less than 120 mmHg and a DBP of less than 80 mmHg. In classifying a patient\\'s blood pressure and determining appropriate therapy, the higher of the two categories corresponding to the SBP and DBP is the one that is used. Per JNC-7 guidelines, treatment of stage 2 hypertension should involve the consideration of a two-drug regimen initially. The goal blood pressure in patients with diabetes is a SBP less than 130 mmHg and a DBP less than 80 mmHg. An ACE inhibitor should be used as the drug class has been shown to slow the progression of diabetic nephropathy and reduce albuminuria. Thiazide diuretics, betablockers, and calcium channel blockers are appropriate choices to consider in this patient in addition to an ACE inhibitor.

QUESTION 4

A 63-year-old Native American male, with a 6-year history of DM, hypertension, and hyperlipidemia, comes to your office as a new patient for a routine examination. He has been experiencing frequent lower back pain and headaches for which he is taking ibuprofen daily for the past 5 weeks. Moreover, he is complaining of mild fatigue. In addition, he is taking aspirin, atorvastatin, verapamil, and glipizide. His physical examination shows a blood pressure of 165/80 and heart rate of 90 bpm. In general, he was not in any distress. His funduscopic examination reveals no signs of diabetic retinopathy. Cardiac examination reveals a regular rate and rhythm with an S4 gallop. His lungs are clear and abdominal examination is unremarkable without any bruit auscultated. He also has 2+ lower extremity pitting edema. Rectal examination reveals brown stool, negative for occult blood. His laboratory results are as follows:

Which of the following antihypertensive medications would be best implemented in patients with diabetic nephropathy?

	Blood	Urine
Sodium	137	Specific gravity: 1.012
Potassium	5.0	Protein: trace
Chloride	115	RBCs: 1–3
CO_2	20	WBCs: 0–3
BUN	30	No cellular casts
Creatinine	1.6	
Glucose	131	24-h specimen: 5.2 g protein
Total protein	8.5	
Albumin	3.0	
AST	15	
Total bilirubin	0.3	
LDL cholesterol	160	
WBC	8,700	
Hgb	8.5	
HCT	24	
PLT	245,000	

A. lisinopril 10 mg orally once daily

B. clonidine 0.2 mg orally twice daily

C. metoprolol 25 mg orally twice daily

D. amlodipine 5 mg orally once daily

E. hydralazine 25 mg orally three times daily

Correct Answer: A Section: (none)

Explanation:

This patient\\'s presentation and laboratory data are consistent with nephrotic syndrome. Nephrotic syndrome is typically associated with proteinuria of greater than 3.5 g/day, hypoalbuminemia, edema, and hyperlipidemia. Abnormalities commonly seen in nephrotic syndrome include hypocalcemia (due to vitamin D deficiency), low thyroxine levels (due to loss of thyroxine-binding globulin [TBG]), and microcytic, hypochromic anemia (due to transferring loss). Hypocomplementemia may be found in some forms of nephrotic syndrome, but this is not a typical finding. Hematuria is one of the components found in nephritic syndrome.

This patient has history, physical, and laboratory findings that suggest possible multiple myeloma. For example, his history is pertinent for lower back pain and headaches. Moreover, Bence-Jones protein is not usually detected by urine dipstick but will be detected during a 24-hour urine collection. This would explain why there is relatively little urine protein detected on dipstick but over 5 g on the 24-hour urine. Lastly, multiple myeloma should be considered in an older patient with unexplained anemia. Given these findings, a serum and urine protein electrophoresis would be the best test to order next. A kidney biopsy would usually be diagnostic, but is unnecessary if the electrophoresis is positive. Complement levels and anti-GBM titer would not be of any use at the present time. Checking glycosylated Hgb will inform you of the adequacy of glucose control, but will be of little use with regard to the workup of the nephrotic syndrome. This patient has a low anion gap due to the presence of unmeasured cations in the blood. In this case, they arise from circulating immunoglobulins. The fractional excretion of sodium and urea can be helpful in differentiating prerenal causes from other etiologies of acute renal failure. A split 24-hour urine for protein is helpful in determining the presence of orthostatic proteinuria. Initiation of ACE inhibitors or angiotensin receptor blockers is the best option in patients with diabetic nephropathy, as these medications have been shown to slow the progression of kidney disease. The other medications listed may be used adjunctively, with an ACE inhibitor or angiotensin receptor blocker, if adequate blood pressure control could not be achieved with monotherapy. HIV-associated nephropathy is typically associated with a collapsing glomerulopathy, a variant of focal segmental glomerulosclerosis. Membranous nephropathy is associated with a number of other infections, including syphilis, hepatitis B, and hepatitis C virus. Membranoproliferative glomerulonephritis has also been associated with hepatitis C virus.

QUESTION 5

You are evaluating a journal article describing a test for the diagnosis of congestive heart failure (CHF). In the study described, 250 consecutive patients were given the test. Of the 250 subjects, 106 tested positive for CHF and 144 tested negative. All 250 subjects were then evaluated by expert cardiologists who were blinded to the results of the experimental test. These cardiologists determined that of the 106 persons who tested positive, 95 actually had CHF. Further, the cardiologists found that of the 144 who tested negative, 2 truly had CHF

What is the specificity of this test for the diagnosis of CHF?

A. 39%

B. 61%

C. 75%

D. 93%

E. 98%

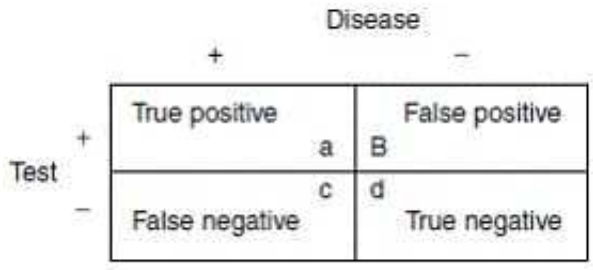
Correct Answer: D Section: (none)

Explanation:

Explanations:

Understanding the concepts of sensitivity, specificity, PPV, and NPV is crucial to interpreting diagnostic test results. Sensitivity is defined as the percentage of people who have a disease who test positive for that disease. Specificity is defined as the percentage of people who are free of a disease who test negative. These two concepts are considered characteristics of the specific test in question and are independent of the prevalence of the disease in the population. The PPVs and NPVs of a test are the test\\'s clinical characteristics and these concepts are directly related to the prevalence of the disease in the population. The PPV is the percentage of people who have a positive test result who actually have the disease. Similarly, the NPV is the percentage of people who have a negative test result who don\\'t have the disease. While the definitions may seem subtly different, the implications are significant. The usual way to calculate sensitivity, specificity, PPV, and NPV is with the table, using the following definitions

The definitions of sensitivity, specificity, PPV, and NPV would then be:



Sensitivity = a/(a + c)

Specificity = d/(d + b)

PPV = a/(a + b)

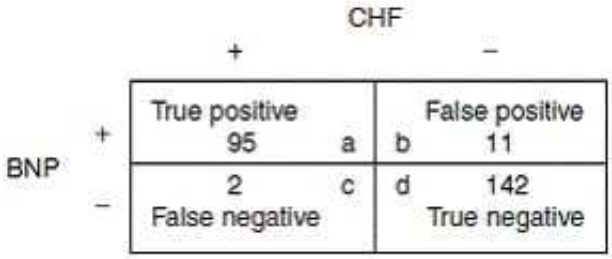
NPV = d/(d + c)

The specific information in this question comes from an article describing a study of B-type natriuretic peptide (BNP) for the diagnosis of CHF. The data presented show that 106 persons tested positive using the BNP test. After comparison with the "gold standard," in this case, a review by expert cardiologists, 95 of these 106 were determined to truly have CHF. Therefore, 11 of the 106 were false positives and 95 were

true positives. Similarly, 144 persons tested negative using the BNP test. Of these, 142 were confirmed as

true negatives and 2 were determined to be false negatives.

Putting these numbers into a table reveals:



The calculations then become:

Sensitivity = a/(a + c) = 95/(95 + 2) = 98%

Specificity = d/(d + b) = 142/(142 + 11) = 93%

PPV = a/(a + b) = 95/(95 + 11) = 90%

NPV = d/(d + c) = 142/(142 + 2) = 99%