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| **Detail** | | **Clinical Significance/Impact** |
| **It is Sunday afternoon and you are working in a busy Emergency Department.** | |  |
| **History of present illness:** You are caring for Jaylee Kraft, a 19-year-old African American college student. She was admitted to the ED with a severe headache, pain rating of 10/10, fever of 39.2°C, photophobia, neck pain and altered mental status. She is irritable. Jaylee is accompanied by two friends. | | Fever may indicate infection. Severe headache photophobia, neck pain and altered mental status are neurological symptoms consistent with an underlying disease process that warrants further investigation. |
| **Social History** (from Jaylee and friends)**:** Jaylee moved in with the family of some friends a few weeks ago to save money. Her friends say she is great student, always happy and easy going. Jaylee says she is majoring in photography and has a side business taking advertising photos for local businesses to help her pay for college. | | Behavior described by friends is different than her current behavior and indicate a change from baseline for her neurological status. |
| **Medical History:** No significant medical history. | |  |
| **Subjective History** (from friends)**:** Jaylee and her friends were on a weekend camping trip. They shared a tent Friday and Saturday night. Jaylee seemed “fine” on Saturday but on Sunday she was “crabby.” The group was hiking, which is a favorite pastime for Jaylee, but she complained constantly about the bright sunlight, she had trouble using her camera and took very few pictures. She eventually went back to the campsite. When her friends joined her they found her in a great deal of discomfort. Jaylee was sweating and seemed to be running a fever. They decided to bring her to the closest emergency department, which was several hours away. | | Jaylee’s friends describe behavior changes, she complains of bright lights, difficulty using the camera (equipment that is very familiar to her), history of discomfort, sweating, and possible fever. She took very few pictures. |
| **Nursing Assessment: What assessment data is important and why?** | | **Vital Signs** can be impacted by neurological insults. Changes in VS can indicate Jaylee’s condition is declining or improving. It is important to establish baseline VS.  **Neurological status:** with suspected neurological infection or injury a baseline neurological status must be established.  **Circulatory status**: Jaylee has a high fever and is at risk for sepsis and significant circulatory changes.  **Pain:** Jaylee’s pain is caused by a headache. The headache is occurring concurrently with fever and other neurological symptoms. This indicates Jaylee is experiencing a secondary headache caused by an underlying disease process. |
| **Objective Data**  **General Appearance:** Lying in bed, crying, complains of headache and stiff neck, two visitors at bedside.  Temp: 40°C (104°F)  BP: 130/74  HR: 90  RR: 24  **RESP:** Lungs CTA, respirations even but slightly labored.  **CARDIAC:** Mucous membranes pale. Capillary refill < 3 seconds. Apical HRR. Peripheral pulses palpable X4 at +2. No edema.  **NEURO:** Alert & oriented to person/place/time/situation, with intermittent confusion. ℅ pain (headache) rates a 10/10. Irritable. PERRLA  **GI:** Abd soft non-distended. NABS X4.  **GU:** No urine output noted at this time. Denies pain with urination. States last void was about an hour prior to arriving at the Emergency Department.  **Musculoskeletal:** Able to move all extremities, equal grips bilaterally, ℅ stiff neck and unable to turn head.  **Integumentary:** Skin warm and dry to touch. Dry mucous membranes, cracked lips, small petechiae over left upper torso and abdomen. | | **What data from Jaylee’s assessment and recent clinical history provided by Jaylee’s friends is significant?**  **What diagnosis do you suspect?**  The following symptoms are consistent with **bacterial meningitis:**   * Stiff neck * Difficulty taking pictures * High fever & chills * Headache * Behavior changes * Photophobia * Petechiae * Dry mucous membranes * Cracked lips * Dry mucous membranes * Confusion and Irritability |
| **What tests do you expect the physician to order and why?** | | |
| CT Scan | | May reveal evidence of increased ICP or hydrocephalus. Acute cerebral edema can occur during acute phase. |
| Skull X-ray | | May demonstrate infected sinuses. |
| Lumbar Puncture: Send CSF for glucose, protein, WBC, gram stain and culture. | | Analysis of CSF allows confirmation of diagnosis of meningitis. |
| CBC | | Elevated WBC may indicate infection. |
| Chemistry | | To measure glucose and electrolyte levels as well as fluid and electrolyte balances. |
| Coagulation Profile | | Disseminated intravascular collapse (DIC) is a complication of bacterial meningitis. |
| Serum blood glucose | | Can be elevated with bacterial meningitis |
| **What orders do you expect and why?** | | |
| Neuro check every two hours | | It is necessary to closely monitor the patient’s neurological status. |
| Droplet Precautions | | Bacterial Meningitis is highly contagious. |
| Broad Spectrum Antibiotics | | To treat infection. |
| **Diagnostic Test Results** | | |
| LP-Results | Culture pending, CSF was turbid and cloudy. Elevate protein and glucose. | CSF results are consistent with meningitis. |
| CBC | WBC: 30,000/mm3  Neutrophils: 25,000/mm3  Lymphocytes: 4,000/mm3  Monocytes: 600/mm3  Eosinophils: 300/mm3  Basophils: 100/mm3  RBC: 4.5 X 1012/L  Hgb: 14 g/dL  HCT: 40%  Platelets: 300,000/mcL | Elevated white count (neutrophils) is consistent with infection. |
| CT Scan | No lesions noted. | No significant findings. |
| Chemistry | BUN: 18 mg/dl  Creatinine: 1.2 mg/dl  Na: 135 mmol/L  K: 4.5 mmol/L  Cl: 100 mmol/L  Ca: 9.6 mg/dl  Glucose: 120 mg/dL  Phosphate: 1.0 mmol/L | Chemistry is within range. |
| PT/PTT | PT: 12.8 Seconds  PTT: 100 seconds  INR: 4 | PT is elevated. PTT is within the upper limits of “normal” and warrants close monitoring.  Bacterial meningitis can lead to meningococcal septicemia. The severe physiological consequences of the disease, is a result of the changes in the natural regulatory functions of the microvasculature. The complex physiology of meningococcal sepsis is largely explained by four basic processes affecting the microvasculature:   1. Increased vascular permeability. 2. Pathological vasoconstriction and vasodilatation. 3. Loss of thrombo-resistance and intravascular coagulation. 4. Profound myocardial dysfunction.   These events are largely responsible for the development of shock and multi-organ failure.  (Patho, Faust & Levin, 2003) |
| **Family Education** | | |
| **What education is essential to communicate to Jaylee’s friends & family right now?**  **What is important to tell the family about droplet precautions?** | | •People who have close contact with anyone who has bacterial meningitis should be given prophylactic antibiotics.  •Jaylee’s friends and the family she moved in with may require treatment.  •Educate about droplet precautions:  •Explain the WHY: For your safety, isolation precautions are implemented for patients known to be infected with pathogens/infections transmitted by respiratory droplets (coughing, sneezing, or talking).   1. Put a mask on the patient during transportation. 2. All healthcare personnel and visitors entering the room will don a mask upon entry into the room. 3. Jaylee’s visitors must avoid common areas as their clothing could be contaminated. 4. Place patient in a private room. |
| **Case Study Continued** | | |
| Jaylee is being transferred to the Medical ICU. You prepare to call report to the ICU nurse Ami, RN. You review Jaylee’s most recent labs and presenting symptoms. Jaylee’s LOC has deteriorated since her arrival to the emergency department. She has attempted to pull out her IV several times and attempts to get out of bed. She is in bilateral soft wrist restraints to her upper extremities. She is agitated and increasingly lethargic. She is oriented to person, place. She verbalizes that is sick but insists upon getting out of bed. She has no family at bedside. Her friends have stayed with her. Her parents live several hours away and anticipate they will arrive in about 4 hours. Jaylee received one dose of IV Ampicillin one hour ago. The next dose is scheduled in seven hours. She had one seizure about two hours ago that lasted 45 seconds. She is receiving LR @ 50 ml/hour. | | She had a seizure and she is attempting to get out of bed. It is concerning that Jaylee’s neurological status has declined.  No family at bedside.  Jaylee is in restraints and this places her at increased risk for injury.  It is important antibiotics are given on time. |
| **Considering Jaylee’s history, what information is important to include handover?**  **Practice using the SBAR format.** | | |
| **Situation:** Jaylee is a 19 year-old-African American female being admitted with suspected bacterial meningitis. No family with her. Her parents are on their way but they don’t live nearby and won’t arrive for at least four hours. Two of her friends are with her.  **Background:** Jaylee was camping with friends when she experienced a fever and neurological changes. She is a college student and works as a photographer. She lives with a family. She picks up side jobs as a photographer to earn extra money.  **Assessment:** Jaylee is alert & oriented to person/place/time/situation, with intermittent confusion. Complains of headache and rates pain a 10/10. PERRLA. Her LOC has deteriorated since her arrival to the ED. She is agitated and increasingly lethargic. Her WBC’s are elevated at 30,000/mm3 and her neutrophils are 25,000/mm3. Her CSF was turbid and cloudy and positive for glucose and protein. PT is elevate and PTT is within range but at the upper limits of expected ranges. She verbalizes she is sick but has attempted to pull out her IV several times and attempts to get out of bed. She had one seizure about two hours ago that lasted 45 seconds. Circulatory status is stable: Skin warm and dry to touch. Capillary refill < 3 seconds. Apical HRR. Peripheral pulses palpable X4 at +2. No edema. Able to move all extremities, equal grips bilaterally, ℅ stiff neck and unable to turn head. Dry mucous membranes, cracked lips, small petechiae over left upper torso and abdomen.  **Recommendation:** CSF culture is pending. She is in bilateral soft wrist restraints to her upper extremities. Jaylee received one dose of IV Ampicillin one hour ago. The next dose is scheduled in seven hours. Seizure precautions. Droplet Precautions. Frequent Neuro checks. Continue to monitor PT/PTT. She is receiving LR @ 50 ml/hour. She has not had a blood culture. | | |
| **What medication orders will Ami anticipate and why?** | | •Mannitol-for diuresis  •Phenytoin-seizures  •Acetaminophen-fever  •Decadron-decrease swelling  •Ampicillin (antibiotic)-to treat infection  •Codeine-for headache  •IVF’s as ordered |
| **Which medications (if ordered) could alter Jaylee’s LOC?** | | Codeine |
| **What nursing interventions will Ami implement and why?** | | |
| Monitor restrained patient per hospital policy and remove restraints as soon as safely possible. | | Patients in restraints are at increased risk for injury. |
| Assess VS every 2 hours. | | To evaluate effects of hyperthermia. |
| Assess neuro checks every two hours. | | To monitor neurological status. Neurological changes could indicate increased hyperthermia, brain irritability or increased ICP. |
| Cool cloth over eyes. | | To relieve photophobia. |
| Prevent environmental stimuli. | | To prevent worsening headache and increased confusion. Pain can fatigue the patient further. |
| Keep room quiet and lights low. | | To prevent worsening headache/pain and increased confusion. Pain can fatigue the patient. Low lighting my decrease hallucinations. |
| Manage fever. A cooling blanket may be necessary. | | To prevent worsening hyperthermia and seizure activity. Fever can increase cerebral edema and risk for seizures. |
| Strict I&O | | High fever places patient at risk for fluid volume deficit. Also, risk for DIC places patient at risk for fluid volume shifts. |
| Follow antibiotic schedule | | To maintain therapeutic levels. |
| Assist patient with ADL’s (nutrition, elimination, hydration, personal hygiene). | | Patient may not be aware of needs. |
| **Test your knowledge!** | | |
| **How is viral meningitis different than bacterial meningitis?**   * Which type is a medical emergency? * What are the common causes of viral meningitis? * Which type is most likely to have permanent complications? * How is the CSF different? * Which type has a high mortality rate? | | * Bacterial meningitis is a medical emergency. * When meningitis is suspected patients are typically placed on antibiotics until bacterial meningitis is ruled out. * The most common causes of viral meningitis are enteroviruses, arboviruses, HIV, herpes simplex virus. CSF is tested for enterovirus. * Viral meningitis is self-limiting. * Left untreated, bacterial meningitis has a mortality rate near 100%. * Full recovery is expected with viral meningitis. * In viral meningitis CSF can be clear or cloudy and typical finding is lymphocytosis. |
| **Discharge Instructions** | | |
| You are preparing Jaylee for discharge. She was in the ICU for 20 days and on the medical surgical unit for 10 days. She continues to have headaches. She is able to ambulate with minimal assistance. She is able to feed herself, but is on a pureed diet. She has a decreased appetite and is easily fatigued. What instructions will be included in her discharge? | | * Jaylee will require several weeks of rest. She may not be able to return to school immediately. Increase activity as tolerate. * Adequate nutrition including high-protein, high-calorie meals. * Muscle rigidity in the neck and the back of the legs may persist. Warm baths and progressive range of motion exercises may be helpful. * Residual effects could include dementia, seizure, deafness, hemiplegia, hydrocephalus. Some of these may be permanent. * Follow up with PCP. Follow up with neurologist may be warranted. Outpatient PT and speech and occupational therapy. |

References

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