Britney De Palma, Paige Coutlee
Joanne Jones
January 30th, 2020

Substance Use Disorder Homework

1. Review the Clinical Institute Withdrawal Assessment for Alcohol (CIWA – pronounced See- WAH) protocol, provided on Moodle. Explain why the medication diazepam is beneficial in controlling withdrawal symptoms. (2)

   Diazepam in within the class of Benzodiazepines which function by depressing the central nervous system. More specifically, it works by enhancing the inhibitory neurotransmitter, GABA. GABA blocks the neurotransmitters released by the brain which are responsible for brain stimulation causing brain and body relaxation in the individual. Without these relaxing effects, people in alcohol withdrawal are susceptible to symptoms such as seizures, anxiety, and tremors due to the brain being overstimulated.

   (Jeurgens, 2019)

2. Why are clients started on vitamin B1 (thiamine) either orally or intravenously while on the alcohol withdrawal protocol? How does this relate to Wernicke-Korsakoff's Syndrome (3)

   Clients are more at risk for vitamin B1 (thiamine) deficiency due to specific issues that arise when experiencing alcohol withdrawal such as inadequate nutritional intake, inflammation of the stomach lining, decreased absorption of thiamine in the GI tract and reduced uptake in the cells. Impaired utilization of thiamine present in the cells may also factor into deficiency of thiamine. This is clearly linked with Wernicke-Korsakoff's as it is a neurological disorder caused by B1 vitamin thiamine deficiency.

   (Martin, Singleton & Hiller-Sturmhöfel, 2003)

3. What is megaloblastic anemia? Why are alcoholics at risk for this type of anemia and how is this risk managed in the CIWA protocol? (3)

   Megaloblastic anemia occurs when the bone marrow creates large, immature red blood cells in which are irregular in structure. Additionally, there is an abnormally low amount of circulating red blood cells, white blood cells, and platelets, which can result in fatigue, pallor, increased risk of infection, and bleeding complications. Alcoholics are at a higher risk for this type of anemia due to a deficiency of folic acid in which can be caused by poor nutritional intake. The ingestion of alcohol can also speed up the process of folic acid deficiency. The CIWA protocol states patients are to be prescribed one daily dose of vitamins (PO/IV). This will help to eliminate the effects of folate or Vitamin B12 deficiency.

   (Ballard, 1997)

4. What are two limitations of the CIWA or the CIWA-Ar tool? (2)

   The CIWA and CIWA-Ar tool may have specific limitations to assess a client. For example, it is not specific to a patient who may possess physical or mental disabilities. It is also a question-based tool which may be a downfall as patients can embellish or withhold information.

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5. Attached is the Nicotine Replacement Therapy (NRT) document. Review the NRT product instructions on page two. Why is it important to teach/inform clients to avoid acidic drinks 15 minutes prior to using a nicotine replacement product (e.g. gum, inhaler, or lozenge) and while using the product? (1)

   It is important to teach/inform clients to avoid acidic drinks 15 minutes prior to using a nicotine replacement product and it inhibits the absorption of nicotine at the buccal route. In general, acid in drinks can decrease nicotine absorption in the body.

   (Wadgave & Nagesh, 2016)

6. You are providing care to a client that is being started on Nicotine Replacement Therapy (NRT). While you are reviewing the NRT teaching sheet, the client states "I don't need to use this stuff because I've asked my partner to get me a Juul e-cigarette so I can kick the habit". How would you respond to the client? (1)

   "E-cigarettes/vapes reduce the harm of smoking due to the removal of tobacco and toxins in cigarettes, however, it does not eliminate the nicotine intake. This being said, you may choose lower levels of nicotine, but this is still not an ideal means of replacement therapy."

7. There has been a rise in teens participating in the practice known as becoming "nic-sic" or to "nic-out". What does it mean to become "nic-sic" and what are the dangers associated with this practice? (2)

   Teens participate in practice known as becoming "nic-sic" or to "nic out." This can also be described as experiencing a headrush. This practice is dangerous as it is consuming nicotine above the individual's tolerance. This can lead to symptoms such as nausea, vomiting, headache, and an increase in heart rate/blood pressure. Tachypnea may also be a symptom of this and over a period of time the symptoms may worsen or shift to a slower heartbeat/blood pressure, weakness and in serious cases, cardiac arrest.

   (American Lung Association, 2019)

8. There has been much in the press about acute lung injuries related to vaping. There are two types of lung injury. In the US, lung injury has primarily been EVALI (E-Vaping associated lung injury) and in Canada it has been Bronchiolitis obliterans aka "popcorn lung". Explain the underlying physiologic mechanism for both of these acute lung injuries. (4)

   EVALI has been linked to substances containing THC and vitamin E acetate. Vitamin E acetate is usually not harmful when ingesting it as a vitamin supplement or used on the skin. However, if this substance is inhaled, it impedes on normal lung functioning. The pathogenesis of EVALI is not fully known, although it has been linked to acute lung injury. EVALI can often be associated with the "pathologic findings of acute fibrinous pneumonitis, diffuse alveolar damage, or organizing pneumonia, usually bronchiolocentric and accompanied by bronchiolitis" (Hollingsworth, 2019). Bronchiolitis obliterans is referred to as "popcorn lung" as this condition originated from the chemical found in the butter flavor of microwave popcorn called diacetyl. This same chemical is found in flavors of e-cigarettes which may cause "popcorn lung." It specifically damages the lungs causing scarring and constriction of the airways which leads to decreased gas exchange. Popcorn lung exhibits similar symptoms present in COPD.

   (American Lung Association, 2016)

   (Centers for Disease Control and Prevention, 2020)

   (Hollingsworth, 2019)

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9. How does substance abuse threaten the normal development and maturation of the adolescent brain? Specifically comment on the following ideas: synaptic pruning (arborization) and myelination, plasticity, frontalization, memory and learning. (7)

   The adolescent brain does not fully develop until the age of 25 thus factors such as substance abuse could greatly disrupt the normal development and maturation of the adolescent brain. The internal reward system within an adolescent's brain is still developing which can hinder the brain's ability to fully recover following the use of drugs.

   It has been shown with the use of marijuana that there has been interrupted synaptic pruning in the brain leading to decreased verbal memory and larger volumes of gray matter.

   Generally, in adolescence increased myelination is shown in the frontal lobes of the brain, however, with the use of substances like alcohol and marijuana, this can lead to neuroinflammation and the suppression of myelin.

In adolescents, the frontal lobes are typically the concluding area of the brain to develop. With the introduction of alcohol use, this can cause a decrease in the stimulation of the frontal region and increased stimulation to this region with the use of marijuana.

Adolescents are at higher risk of addiction in comparison to adults as a consequence of the brain's plasticity. In response to the introduction of alcohol or drugs, an adolescent's brain reconfigures itself leading one to make a habit of unhealthy tendencies. Thus, this causes adolescents to have a lower capacity to make rational decisions further leading to the possibility of addiction.

Adolescents with heavy alcohol use manifest adverse effects on the hippocampus causing detrimental impairment to memory and a reduced ability to learn. Similarly, the use of marijuana in teens can impair cognitive functioning which will in turn, interfere with one's memory and learning abilities.

(FCD Prevention Works, 2016)

(Partnership for Drug-Free Kids, 2018)

(Squeglia, Jacobus & Tapert, 2009)

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