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Research Article

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Coma Requires Special Professional Care

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ABSTRACT

A state of extended unconsciousness is referred to as a coma. Individuals in a coma do not recognize their environment and seem to be asleep. Unlike deep sleep, individuals in a comatose state cannot be roused by any external stimuli, including painful sensations. Head injuries or disruptions in blood circulation to the brain account for more than half of coma cases. Factors such as increased intracranial pressure, hemorrhaging, oxygen deprivation, or toxin accumulation can all result in brain damage. Sometimes this damage is temporary and can be reversed, while in other situations, it may lead to lasting effects.

Keywords: Coma, GCS, FOUR, Patients, Health.

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Introduction

Conditions that alter consciousness pose a challenging diagnostic task for clinicians in critical care environments [1]. They encompass a broad spectrum of medical issues that may be systemic or linked to structural or non-structural disorders within the brain. Prompt assessment and accurate diagnosis that lead to life-saving treatments are crucial since some coma causes are permanent. Nonetheless, this can prove to be challenging in patients who are critically ill. Consequently, doctors need to comprehend the underlying issues related to consciousness and coma, the anatomy and pathophysiology that contribute to this medical condition, a systematic methodology for gathering history and performing examinations, and a swift strategy for assessments and initial treatment applications.

Consciousness is characterized as a complete awareness of oneself and the surrounding environment, consisting of both content and arousal. While arousal relates to being awake and alert, the content of consciousness involves higher cerebral functions and the awareness of one's self and surroundings. It is understandable that having content in consciousness cannot occur without a foundational level of arousal.

Coma

Coma is identified as a state of unresponsiveness [1]. The patient remains in bed with closed eyes and shows no purposeful reaction to outside stimuli. Responses to intense painful stimuli may include flexor or extensor positions, but individuals in a comatose state will not display any meaningful or intentional movements, including localization.

In critical care, several other pathological states of consciousness exhibit varying degrees of arousal and awareness. These include lethargy, obtundation, stupor, clouding of consciousness, and delirium. Patients who are lethargic display significant sleepiness but can be awakened with minor stimuli; however, they tend to revert to drowsiness if continuous stimulation is absent. Obtunded individuals are similar to those who are lethargic but

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show even less engagement with their surroundings and have slower reactions to stimuli. Such patients often display greater sleepiness compared to those who are lethargic. Stuporous individuals need strong stimulation to remain alert, and without it, they quickly enter a state of unresponsiveness, representing a condition between awareness and coma.

In comparison to individuals who need either minimal or more severe stimulation to achieve wakefulness, some patients experience clouded consciousness, confusion, and delirium. Clouded consciousness indicates an altered level of awareness characterized by a lack of attention and decreased wakefulness. On the other hand, a confusional state represents a more serious condition featuring disorientation and the inability to follow directions. Although the terms delirium and confusional state are frequently used interchangeably, delirium, according to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-V), is specifically described as a state with altered consciousness, with fluctuating attention and difficulty concentrating alongside variability in the condition.

Causes

A disorder of consciousness occurs when an individual is wholly oblivious to their own self and the environment and cannot respond appropriately to external stimuli [2]. This condition arises from significant dysfunction in both cerebral hemispheres and/or issues with the ascending reticular activating system. The causes include:

- localized brain dysfunction, such as tumors, vascular incidents, demyelination, infections, or traumatic brain injuries.
- widespread brain dysfunction:

- infections like meningitis or encephalitis.
- seizure disorders.
- lack of oxygen or excessive carbon dioxide levels.
- drug-related issues, including toxicity and overdose.
- metabolic or endocrine disorders (for example, diabetic ketoacidosis, liver or kidney failure, hypothyroidism), and imbalances in electrolytes (for instance, low sodium or high calcium).
- low blood pressure or hypertensive emergencies.
- trauma to the head.
- bleeding in the subarachnoid space.
- low body temperature or high body temperature.

Evaluating pupil reactions, eye movements similar to a doll's, physical posture, motor responses (such as decerebrate and decorticate positions), and breathing patterns is particularly significant. Diagnostic efforts focus on the aforementioned causes. Immediate care consists of vital respiratory and cardiovascular support akin to CPR techniques and addressing the root causes of the condition. Furthermore, long-term care should involve monitoring areas at risk of pressure sores, oral hygiene, eye care, physiotherapy, preventing deep vein thrombosis, and maintaining proper nutrition and fluid levels. A coma may result in complete recovery, a vegetative state, or brainstem death.

Scoring frameworks are available for evaluating the levels of coma in nonresponsive patients and for tracking their progress, which may also provide insights into potential outcomes.

1. General scales are utilized, such as the AVPU scale or a straightforward scoring system from 1 to 5:
- 1 = fully alert.
- 2 = aware but lethargic.
- 3 = unresponsive but reacts to pain with goal-directed movement, such as flexing.
- 4 = unresponsive; reacts to pain with extension movements.
- 5 = unresponsive with no reaction to pain stimuli.

2. Additional information (for instance, from eye reflex assessment) may be overlooked; hence, more detailed or specific assessment systems are employed:
- Glasgow coma scale (GCS).
- FOUR (Full Outline of Unresponsiveness) score.
- tailored scoring for certain conditions, such as liver failure or subarachnoid hemorrhage.

GCS

Glasgow Coma Scale (GCS) was initially introduced by Teasdale and Jennett in 1974 as a method to evaluate brain function [3]. Over the years, GCS has become essential in multiple triage systems, including trauma score, revised trauma score (RTS), CRAMS scale, and trauma triage guidelines. This scale assesses brain activity through eye opening, motor skills, and verbal communication. The optimal responses for motor, verbal, and eye functions are quantified with scores from 1 to 6, 1 to 5, and 1 to 4, respectively. The GCS ranges from a minimum of 3 to a maximum of 15; a score above 13 indicates a mild head injury, scores between 9 and 12 suggest a moderate head injury, and a score of 8 or less denotes a severe head injury. Research indicates that the highest motor response is a significant predictor of outcomes in individuals with head injuries. Patients who can follow simple commands tend to have more favorable outcomes compared to those who cannot. The reliability of GCS has been validated through numerous studies over the years. There is a linear relationship between GCS scores and both morbidity and mortality rates in trauma patients.

Limitations

1. Evaluating GCS can be challenging in patients who are sedated or paralyzed, which is frequently seen in the treatment of those with head injuries. The 'motor only' approach is unreliable and inappropriate for use in paralyzed individuals or those with high cervical spine injuries accompanied by neurological deficiencies.
2. Various other conditions can influence brain function and thus impact GCS scores, such as imbalances in electrolytes, low blood sugar, severe infections, and others.
3. Some researchers believe that the subscore for ‘Best eye opening response’ is unnecessary, as it may not always be possible to obtain this response, thereby offering minimal additional predictive capability.

Patient

It is crucial to quickly differentiate between metabolic and structural reasons for coma, given their vastly different physiological mechanisms and treatment approaches [4]. A patient's history can assist in this differentiation if it indicates prior trauma or substance use. The abrupt onset of coma may point to a seizure or a vascular incident (for instance, subarachnoid hemorrhage or brainstem stroke). If coma develops after minutes to hours of localized neurological deficits, this might indicate supratentorial intracerebral hemorrhage with a rise in intracranial pressure. Conversely, a gradual emergence of focal symptoms over days to weeks prior to loss of consciousness may indicate the presence of an abscess, tumor, or subdural hematoma, while rapid progression to coma in the absence of focal deficits suggests a metabolic origin.

The environment where coma arises may indicate factors such as trauma, extreme heat, extreme cold, or exposure to toxins (for instance, organophosphates or carbon monoxide). The presence of medications close to the unresponsive individual can provide crucial information. For instance, not only can the problematic substance(s) be identified, but also the medication containers with the physician's name can offer additional medical history about the patient. At the very least, understanding a patient's medications can highlight existing health issues. In individuals struggling with alcohol use, possible poisoning from substances like ethanol, ethylene glycol, methanol, or isopropyl alcohol should be considered. For those diabetic patients, common reasons for a coma include hypoglycemia, diabetic ketoacidosis (DKA), and hyperosmolar states. Additional health conditions such as hypothyroidism, kidney failure, liver cirrhosis, or mental health disorders may also raise the chances of a metabolic origin, while incidents of falling, a past stroke, brain tumors, extraneous tumors, or atrial fibrillation point to possible structural or vascular concerns. Patients with known cancerous growths may face both physical damage in the brain (such as metastasis and bleeding) and metabolic issues (like hyponatremia and hypercalcemia). Likewise, unmanaged high blood pressure can lead to coma through metabolic (such as hypertensive encephalopathy) or structural (like intracerebral hemorrhage) pathways. Individuals with weakened immune systems, particularly those with inadequately managed human immunodeficiency virus (HIV) infection, have an increased chance of experiencing structural reasons for coma, including central nervous system infections and lymphatic cancers.

The assessment of a comatose individual should occur alongside immediate treatment [5]. Supportive care for breathing or blood pressure begins; in cases of hypothermia, all patients need to be warmed up before determining the prognosis.

The patient may be situated on their side with the neck slightly extended, dentures taken out, and fluids cleared using suction. If necessary, airway passage can be ensured with an oropharyngeal airway. Blood samples should be collected for serum glucose, electrolyte, and calcium concentration analysis; arterial blood gases (ABGs); liver and kidney function tests; and toxicology examinations as needed. Intravenous administration of thiamine (100 mg), followed by 50% dextrose (25 g), and naloxone (0. 4–1. 2 mg) should be performed without hesitation.

Subsequent information is gathered from caregivers regarding the patient's medical background, the events leading to the coma, and the timeline of what followed. An abrupt onset of coma points to potential causes like subarachnoid hemorrhage, brainstem stroke, or intracerebral bleeding, while a gradual onset and progression typically align with other structural or mass-related issues. An urgent non-contrast CT scan of the head is essential to detect any intracranial bleeding, brain herniation, or other physical abnormalities that might necessitate swift neurosurgical action, and a CT angiogram is critical to eliminate the possibility of basilar artery blockage. A metabolic reason is probable if there was a preceding state of intoxication or agitated delirium. During the evaluation, focus should be placed on the individual's reactions to painful stimuli, the pupils and their light response, the reaction when the cornea is touched with a piece of sterile gauze, the positioning of the eyes and their movement with passive head motion and ice-water caloric testing, as well as the breathing pattern.

Coma in Children

Medical factors are responsible for 90 percent of coma incidents in children, while structural issues account for the remaining 10 percent [6]. In instances where the reason for the coma is not immediately apparent, urgent laboratory assessments should be performed, including blood glucose levels, a full blood count, urine analysis (which may require catheterization), as well as tests for pH and electrolytes (including bicarbonate), serum urea nitrogen, liver function, and ammonia levels. If the root cause remains unclear, samples of urine, blood, and even stomach contents can be tested for toxins. Infections are a frequent contributor, representing 30 percent of cases, thus necessitating blood cultures and lumbar punctures in many situations. Nonetheless, the presence of papilledema or focal neurological deficits may act as relative contraindications for a lumbar puncture before conducting imaging tests. In cases of unclear coma, further assessments might include measuring partial pressures of oxygen and carbon dioxide, examining serum and urine osmolality, testing for porphyrins, lead levels, amino acids, and analyzing urine organic acids.

In situations where severe head injuries, intracranial bleeding, or elevated intracranial pressure are suspected, an urgent CT scan or MRI is essential. CT scans are generally quicker and more effective than MRIs for identifying small bleedings, while MRIs are more proficient in unveiling strokes and anoxic brain injuries. Shortened MRI protocols are being increasingly employed to eliminate concerns about hemorrhage and hydrocephalus, thereby avoiding unnecessary exposure to ionizing radiation from CT. CT bone windows or skull X-rays may provide clearer images of skull fractures. It's important to note that a lack of skull fractures does not exclude the possibility of coma resulting from closed head trauma, which can occur with abusive head trauma incidents.

An EEG can occasionally assist in determining the cause of a coma, such as in cases of nonconvulsive status epilepticus, specific abnormalities like periodic lateralized epileptiform discharges linked to herpes encephalitis, or focal slowing associated with stroke or cerebritis. EEG findings may also

correlate with the coma's stage and provide additional prognostic insights.

Examination

Physical examination should commence with a comprehensive assessment of the entire system to identify signs that could point to a potential underlying cause [1]. Elevated blood pressure might suggest a heightened adrenergic response due to a brain hemorrhage, while low blood pressure could indicate either septic or cardiogenic shock. Either low body temperature or high body temperature can imply an infection is present. Additionally, low body temperature may occur due to hormonal imbalances such as hypothyroidism or Addison's disease. High body temperature could indicate conditions like neuroleptic malignant syndrome or serotonin syndrome. High blood pressure along with elevated temperature can occur in various instances of drug overdoses, such as from cocaine, amphetamines, or phencyclidine. A detailed assessment of the skin might reveal a rash indicative of meningitis, skin changes seen in endocarditis, or bruises associated with a coagulopathy. Skin blisters are frequently observed in cases of barbiturate poisoning. Notable periorbital bruising, often referred to as “raccoon eyes,” or bleeding behind the ear, identified as the “Battle sign,” may be detected upon examining the head, which can indicate a fracture at the base of the skull. Examination of the fundus can reveal swelling of the optic disc, indicating increased pressure inside the skull due to various potential reasons. A portable ultrasound can assist in measuring the diameter of the optic nerve sheath, which has been shown to be related to intracranial pressure levels. Stiffness in the neck may be present in cases of meningoencephalitis or subarachnoid hemorrhage. Yellowing of the skin and fluid build-up in the abdomen may suggest liver issues and the potential for hepatic encephalopathy or, more critically, brain swelling due to liver failure. Lastly, the breath can have specific odors; it may be sweet in the case of ketoacidosis, musty with acute liver failure, onion-like with paraldehyde poisoning, or garlic-scented with organophosphate poisoning.

The neurologic assessment, despite its limitations, plays a crucial role in determining the location of intracranial issues that may cause a coma. This examination allows the practitioner to monitor changes in neurological status over time, enabling the detection of either improvements or declines. Key components of the neurologic evaluation during a coma include motor responses, reactions of the pupils, eye movements, and breathing patterns which aid in pinpointing problem areas. The motor response is a critical part of the findings evaluated in both the Glasgow Coma Scale and the Full Outline of UnResponsiveness score. Flexor or decorticate posturing indicates issues within both cerebral hemispheres or thalamus dysfunction. In contrast, extensor or decerebrate posturing suggests problems within the red nucleus of the midbrain. Abnormal movements such as asterixis may present in toxic-metabolic encephalopathy, while a combination of asterixis and myoclonus can occur in individuals with uremic encephalopathy. Intense myoclonus might be evident after a cardiac event and in cases of lithium poisoning, cephalosporin exposure, or pesticide contact. Differentiating between myoclonus and shivering or rigor is essential, as it could steer the physician towards identifying an entirely different underlying issue. Rhythmic movements can point towards seizures, necessitating additional evaluation.

In the case of toxic-metabolic coma, the pupillary reactions may be diminished and slow, appearing normal without indicating other brainstem reflex impairments. The presence of one or both pupils being dilated and unresponsive should raise concern for the doctor regarding a structural cause of the coma and possible pressure on the brainstem.

Treatment

The initial approach to managing a patient in a coma requires stabilization [7]. Important interventions include safeguarding the airway, confirming cardiovascular stability, and providing respiratory assistance, all of which could be crucial in the critical minutes to hours after the coma begins. A thorough physical examination should check for indications of injury and localized neurological impairments. Early laboratory tests should encompass measuring blood glucose levels, performing an electrocardiogram, conducting a complete blood count, executing a comprehensive metabolic panel, and obtaining a brain CT scan. Further assessments, such as analyzing cerebrospinal fluid, conducting an EEG, and/or performing a brain MRI, should be directed by the patient's clinical history and findings from the examination. In the acute phase, treatment mainly focuses on addressing the primary cause and reducing the likelihood of harmful neurological outcomes, such as resuscitation efforts and implementing targeted temperature management in instances of cardiac arrest.

Subsequent management is determined by the specific diagnosis and the potential for complications. It is generally crucial to refrain from using medications that could complicate the assessment of coma, such as sedatives or medications that depress the central nervous system. Some suggest employing standard pain management during procedures, as research indicates that 15–40% of individuals classified as comatose may still be aware of their environment but lack the ability to respond physically in a way that conveys distress. Still, systemic sedatives and anxiolytics can worsen coma and lead to poorer outcomes; therefore, if possible, it is preferable to use local or regional anesthetics.

Patients who remain in states of extended unresponsiveness are particularly vulnerable to skin breakdown, musculoskeletal injuries, and neuromuscular issues stemming from lack of movement and the inability to adjust their position independently. It is essential that nursing and respiratory care focus on regular turning and proper positioning to prevent these types of injuries. In cases of prolonged coma, when there is no spontaneous sleep/wake activity and brainstem reflexes are absent following a severe known intracerebral injury, an evaluation for brain death may be necessary.

Prognosis

The prognosis of coma is influenced by its underlying cause [1]. Most individuals in a comatose state eventually regain awareness,

with very few remaining in a long-lasting minimally conscious condition. Overall, several key factors indicate a poor prognosis. Injuries resulting in significant hemispheric swelling, a clinical decline demonstrating loss of brainstem reflexes, occlusion of the basilar artery without restoration of blood flow, traumatic brain injury involving the corpus callosum and brainstem, as well as pontine hemorrhage extending to the thalamus, are all associated with unfavorable prognoses.

In instances of traumatic brain injury, older patients typically have a worse prognosis. Young individuals may exhibit varied outcomes based on their injuries. Additionally, the specific brain areas affected, the presence of associated cerebral edema, and the timing of medical intervention can significantly influence prognosis. The exploration of biomarkers as diagnostic and prognostic instruments is emerging, with hopes that these markers can aid in therapeutic developments.

Some of the most reliable prognostic studies in coma arise from individuals who have experienced cardiac arrest. Unfavorable outcomes were linked to the lack of pupillary reaction and absent corneal reflexes. Furthermore, absence of movement or showing extensor posturing in response to painful stimuli indicated low chances of a good outcome. However, with the introduction of therapeutic hypothermia, these predictive signs have not remained consistent, likely due to various factors such as the lingering effects of sedatives and paralytics utilized during controlled temperature management. Recent findings indicate that responsiveness of the pupils remains a strong predictor of outcome, while corneal reflexes and motor responses seem to be less reliable. Other valuable assessment methods include EEG to evaluate reactivity patterns, somatosensory-evoked potentials, and neuroimaging techniques. While further prospective studies are essential to clarify the effectiveness of these tools, a multimodal approach is likely the most beneficial. As a standard practice, clinicians should ideally wait a minimum of 72 hours before considering the cessation of life-sustaining treatments, unless the patient is declared brain dead; in certain situations, it may take even longer for drugs to be eliminated in the context of therapeutic hypothermia.

Conclusion

Coma represents the most extreme form of diminished consciousness, which can persist for many years. It necessitates specialized medical attention. During a coma, the individual remains unconscious and fails to react even to intense painful stimuli. A neurological assessment shows absent muscle reflexes and pupils that do not react to light. The swallowing reflex is absent, and only essential functions remain, although they may be intermittently compromised. The severity of the coma is typically measured using the Glasgow Coma Scale, and more recently through a detailed scale known as the Full Outline of UnResponsiveness, which offers high precision and practicality. Coma results from significant dysfunction of essential organs brought on by various factors, including trauma, poisoning, infections, circulatory issues, metabolic disorders, tumors, and others.

References

1. Pergakis MB, Chang WTW (2024) Coma. Vincent JL, Moore FA, Bellomo R, Marini JJ (eds): Textbook of Critical Care, Eighth Edition. Elsevier Inc., Philadelphia, USA 270–276.
2. Yentis SM, Hirsch NP, Ip JK (2019) Anaesthesia, Intensive Care and Perioperative Medicine A-Z - An Encyclopaedia of Principles and Practice, Sixth Edition. Elsevier Limited, Edinburgh, UK 147.
3. Sinha C, Gupta B (2016) Triage and Trauma Scoring. Gupta B (ed): Essentials of Trauma Anesthesia and Intensive Care. Peepee Publishers and Distributors (P) Ltd., Delhi, India 23.
4. Marini JJ, Dries DJ (2019) Critical Care Medicine - The Essentials and More, Fifth Edition. Wolters Kluwer, Philadelphia, USA 709.
5. Douglas VC, Aminoff MJ (2025) Nervous System Disorders. Papadakis MA, Rabow MW, McQuaid KR, Gandhi M (eds): CURRENT Medical Diagnosis and Treatment 2025, 64th Edition. McGraw Hill, New York, USA 1006–1007.
6. Schreiner TL, Yang ML, Martin JA, Messer R, Demarest S, et al. (2018) Neurologic & Muscular Disorders. Hay Jr. WW, Levin MJ, Deterding RR, Abzug MJ (eds): CURRENT Diagnosis & Treatment - Pediatrics, 24th Edition. McGraw-Hill Education, New York, USA, 759.
7. Roberson SW, Ely EW, Wilson JE (2020) Manifestations of Critical Illness Brain Injury. Vincent JL (ed): Annual Update in Intensive Care and Emergency Medicine 2020. Springer Nature Switzerland AG, Cham, Switzerland 461–462.

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