

Introduction

Adrenal crisis can lead to a rapid decline in vital body functions, and without prompt and appropriate treatment, can be fatal. The adrenal glands, located on top of each kidney, produce hormones such as cortisol and adrenaline that are essential for various bodily functions. Adrenal crisis can lead to a rapid decline in vital bodily functions, and without prompt and appropriate treatment, it can be fatal. This case is being reported as healthcare professionals and individuals with adrenal insufficiency need to be educated about the signs and symptoms of adrenal crisis along with treatment options. Prompt recognition and early intervention depend on awareness and preparedness, which can significantly impact patient outcomes. Chilkoti (2019) describes drastic variations in outcomes when stress dose steroids are used vs when they are not used, which will play a crucial part in my case presentation. Anesthesia providers often encounter a surgical patient receiving chronic steroid therapy. Perioperative use of steroids is associated with major complications such as acute adrenal crisis in the perioperative period secondary to adrenal insufficiency. Chilkoti (2019) also emphasizes the importance of administering perioperative stress-dose steroids to mitigate this rare but potentially fatal crisis.

Learning Objectives

1. Recognize the signs & symptoms of adrenal crisis
2. Outline treatment interventions for adrenal crisis
3. Importance of perioperative stress-dose steroids

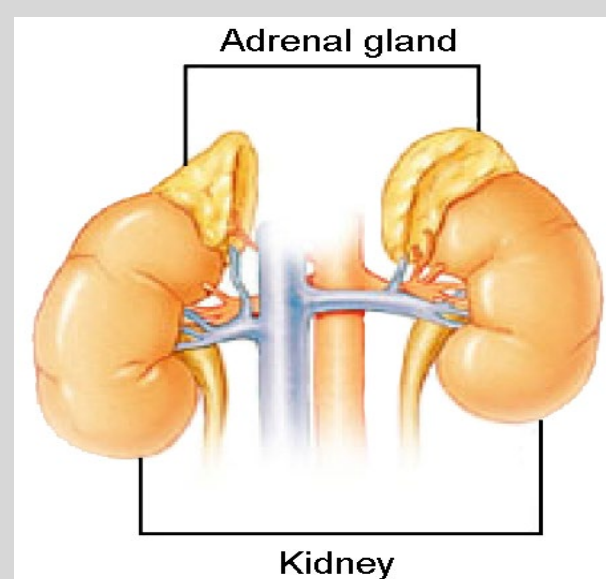
Uniqueness of Case

The complications experienced were unique and required critical communication between the surgeon and anesthesia team.

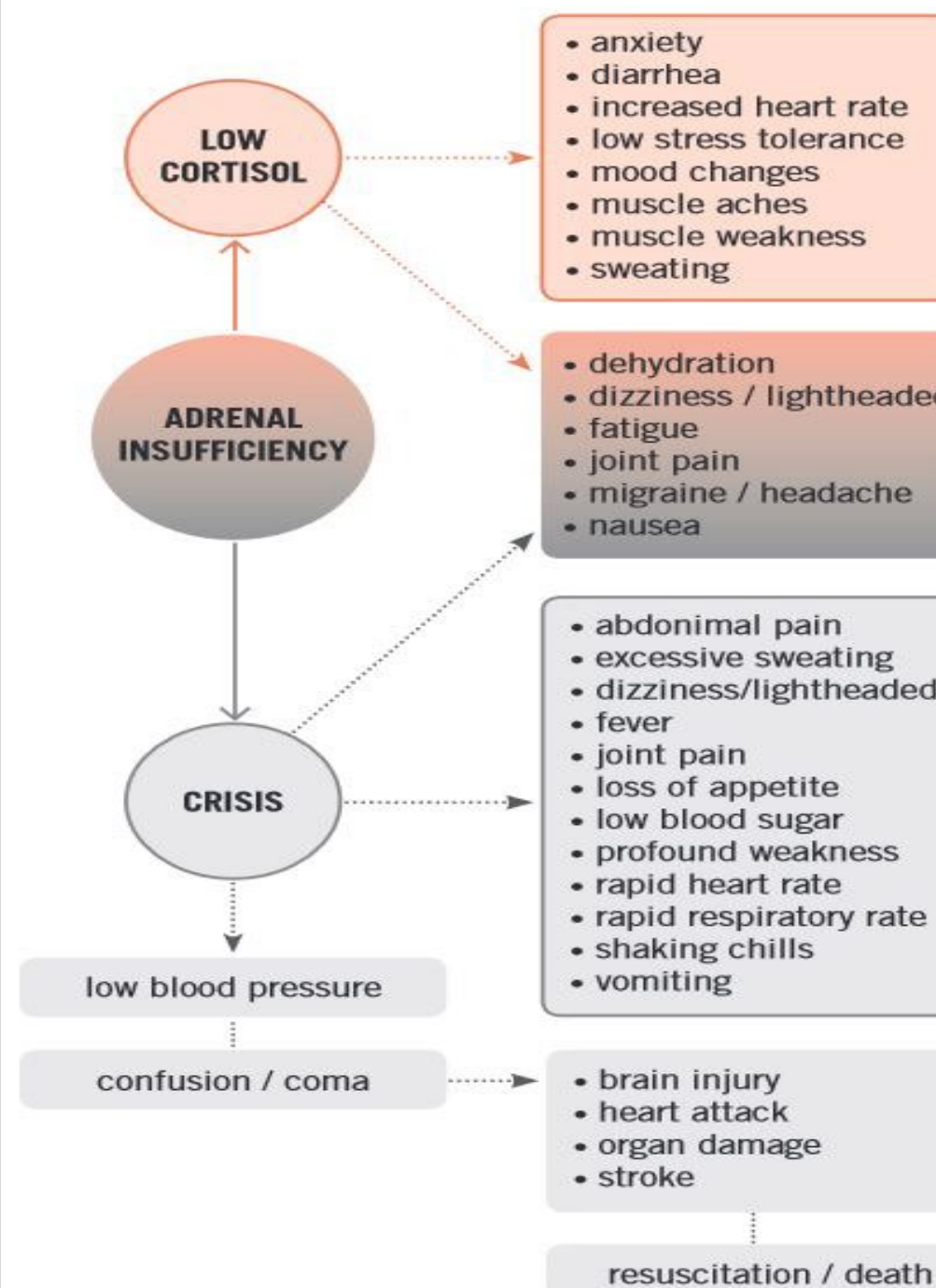
- First sign noticed was severe drop in ETCO2
 - 100% FiO2 and cycled BP
- Severe hypotension
 - Gave fluid and pressors
 - Started a-line for monitoring and ABGs
- No sign of improvement
 - Communicated with surgeon and no signs of major blood loss
- Due to the lack of response to fluid and pressors, team went through differential diagnosis
 - Possible adrenal insufficiency
 - Gave 100 mg hydrocortisone

Patient Description

- Scheduled procedure: ORIF FEMORAL SHAFT FX W/ PLATE & SCREW SYSTEM
 - Sustained fall from wheelchair
- 65-year-old male
- Height = 5'10
- Weight = 111 kg
- BMI = 36.0
- Neuro = Hx of seizures, tremors
- Cardiovascular = Mets>4, hypertension, CVA
- Smoker = never
- Endocrine = T2DM, chronic steroid use, anemia
- GI/Hepatic/Renal = GERD, liver disease (NASH s/p OLT in 2014), Chronic, S/P transplant, renal disease, esophageal varices, increased aspiration risk
- Pysch = depression, mood disorder, suicidal ideation
- Sleep apnea assessment = HTN, BMI>35, Age>50, and male
- Airway exam-
- Mallampati = II
 - Oral Opening: >=3FB
 - TM Distance: >3 FB
 - Normal Cervical ROM: No
 - ETT/Trach in place: No
- Medication = 5 mg prednisone daily for greater than 3 months, Trulicity, Amlodipine, Sertraline, omeprazole
- Laboratory tests =
 - Blood glucose was 425 two days before procedure
 - Day of surgery was 214



SPECTRUM OF ADRENAL INSUFFICIENCY



Intervention

- Significant drop in ETCO2 and Hypotension during procedure = started pt on norepinephrine and vasopressin infusions
- Gave 100 mg of hydrocortisone
- Sent ABGs; Lactate came back elevated at 2.6 (normal range 0.5-1.6); treated with sodium bicarbonate
- TEE showed no clots and RV hypokinetic = gave albumin and crystalloid
- Kept intubated after the aborted procedure
- Continued on pressors until hemodynamically stable
- Taken to the ICU
- CT PE = negative, no pneumonia

Response to Treatment

The patient was stabilized in the ICU and successfully weaned off the ventilator. The patient was taken back to the OR few days later to complete the intended procedure.

Discussion

This patient admitted to the hospital after falling from his wheelchair and fracturing his femoral shaft. He presented with poorly controlled diabetes and greater than 3 months steroid use. During the surgery, there was a drop in ETCO2 from 36 to 20, severe hypotension, and decrease in oxygen saturation. The attending was called and continued to give vasopressors, 100 mg hydrocortisone, lowering sevoflurane, going to 100% oxygen, and increasing fresh gas flow. The attending started an arterial line and sent a blood gas to help guide therapeutic interventions. A cardiac anesthesiologist was called to complete a TEE, which showed hypokinesis of the right ventricle implying hypovolemia. The procedure was aborted, and patient was taken to the ICU intubated. The outcome for this patient ended in a positive note with no long-term illnesses or deficits as he was taken back to the OR after a few days when he was hemodynamically stable.

Conclusions

Identifying adrenal crisis intraoperatively is crucial because adrenal crisis is a life-threatening condition that can have severe consequences if not promptly recognized and treated. Stress-dose glucocorticoids become essential during the perioperative period due to potential cortisol secretion failure to meet increased requirements from surgical stress, adrenal insufficiency, hemodynamic instability, and the risk of adrenal crisis. While existing recommendations suggest approximately 100 mg of hydrocortisone for major surgery, more studies are needed to refine stress-dose glucocorticoid guidelines. Some other steroid options include methyl prednisone, dexamethasone, prednisone. Evaluating patients for possible adrenal insufficiency and tailoring glucocorticoid administration based on surgical stress can contribute to improved patient outcomes.

References

- Adrenal Insufficiency in Adults, Stress Dosing, and Adrenal Crisis. CSRF. (2018, June 1). <https://csrf.net/doctors-articles/adrenal-insufficiency-in-adults-stress-dosing-and-adrenal-crisis/>
- Chilkoti GT, Singh A, Mohta M, Saxena AK. Perioperative "stress dose" of corticosteroid: Pharmacological and clinical perspective. J Anaesthesiol Clin Pharmacol. 2019 Apr-Jun;35(2):147-152. doi: 10.4103/joacp.JOACP_242_17. PMID: 31303699; PMCID: PMC6598572.