**CLINICAL VIGNETTE**

# Perforated Diverticulitis in Undiagnosed Cushing's Disease

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***Introduction***

Hypercortisolism is well-known to cause gastrointestinal issues, especially upper gastrointestinal system complications such as gastritis, gastric ulcer and gastric perforation.[1] However, there are only a few documented cases of lower gastrointestinal issues, especially in the setting of excess endogenous cortisol levels such as Cushing's disease or Cushing's syndrome. This patient presented with recurrent episodes of perforated diverticulitis, and eventually was diagnosed with Cushing's disease associated with an ACTH-producing pituitary tumor.

***Case***

A 47-year-old female presented with concern for leakage around the abdominal drain site. She was recently hospitalized for a second episode of acute diverticulitis complicated by perforation requiring drain placement by Interventional Radiology, and discharged on antibiotics. Her past medical history included DM2, hypertension, and hyperlipidemia. Her recent hospitalization was complicated by profound hyperkalemia that required daily potassium supplementation and initiation of spironolactone, as well as persistently elevated blood pressure requiring multiple medications for improved blood pressure control.

Upon further questioning on this current admission, the patient noted that in the last two years, she noticed increased facial hair on her chin and fluctuating weight, primarily weight gain. In the last three months, she also noticed the skin behind her neck felt thicker and she developed easy bruising with minimal trauma. The patient's daughter reported that the patient was notably more anxious and tearful with no inciting event, and she was having difficulty sleeping at night.

On admission, the patient's vitals included: temperature 36.8C, heart rate 91, respiratory rate 18, blood pressure 122/73, oxygen saturation on ambient air 98%, and weight 68 kg. On physical exam, notable findings were coarse hair on the chin, moon facies, dorsocervical fat pad, striae on the lower abdominal wall and resolving small ecchymoses on the bilateral upper extremities from prior venipuncture. She also had a labile affect with tearfulness. Laboratory analysis was notable for a serum potassium of 1.8 mmol/L. She was given both IV and oral potassium chloride replacement and admitted for further management. CT Abdomen/Pelvis was completed due to reported leakage around the abdominal drain site. It showed the known abscess with the drain in the appropriate position. General Surgery reported no concern for new infection or malfunctioning of the drain, and did not recommend further surgical intervention.

Given the patient's history and the exam findings, evaluation for possible elevated cortisol state was initiated, and the endocrinology service was consulted. Morning cortisol was elevated at 38 ug/dL, and ACTH was elevated at 98 pg/mL. A 24-hr urinary free cortisol was completed and resulted at 5983. Aldosterone was normal at 4.7 ng/dL, renin normal at 1.1, and prolactin normal at 8.1 ng/mL. TSH was 0.46 mcIU/mL and FT4 was 0.59 ng/dL. A low-dose (1mg) dexamethasone suppression test failed to suppress the morning cortisol, which resulted at 57 ug/dL. A high-dose (8mg) dexamethasone suppression test also failed to suppress the morning cortisol, which resulted at 39 ug/dL. Therefore, ectopic ACTH secretion was initially suspected. CT Abdomen/Pelvis with adrenal protocol however showed normal bilateral adrenal glands with no suspicious nodules or masses. MR Brain with pituitary protocol revealed a flattened pituitary gland in an enlarged sella, consistent with a partial empty sella. However, there was no definitive evidence of a pituitary mass to suggest an adenoma.

Given that there was no definitive source for the ectopic ACTH secretion identified on radiographic imaging, the endocrinologist recommended inferior petrosal sinus sampling (IPSS) to evaluate for a pituitary source of excess ACTH secretion. Unfortunately, this procedure could not be done at the admitting hospital, and the patient was transferred to higher level of care with Neuro-Interventional Radiology to perform the procedure. The patient underwent IPSS which revealed increased ACTH secretion from the left inferior petrosal sinus. Given these findings supported a pituitary adenoma and Neurosurgery was consulted and performed transsphenoidal resection of the pituitary tumor. Pathology of the sellar mass confirmed a corticotroph adenoma. The post-operative cortisol nadir was 21, and salivary cortisol was 0.06, indicating biochemical remission. Potassium had improved to 4.7 mmol/L one month after surgery. At outpatient follow up three months after surgery, the patient reported feeling very well, had lost weight, and her daughter stated her mental status and behavior had returned to her normal baseline.

### *Discussion*

Hypercortisolism can be due to either endogenous secretion from a pituitary tumor, Cushing's disease versus ectopic ACTH secretion from a non-pituitary tumor or from exogenous steroid use, Cushing's syndrome. Both can lead to a wide spectrum of symptoms, including weight gain, easy bruising, and neuropsychiatric abnormalities. Elevated cortisol state has also been known to cause gastrointestinal issues, including gastritis and peptic ulcer disease. This is possibly due to decreased gastric mucus secretion, increased acid secretion, and decreased mucosal prostaglandin synthesis.[1] However, there is little documentation of lower gastrointestinal tract complications related to hypercortisolism, particularly due to endogenous hypercortisolism.[2] One case described a patient with cushingoid features who presented with abdominal pain, and was found to have both perforated diverticulum and new diagnosis of Cushing's disease.[3] The proposed pathophysiology of diverticulitis in the setting of hypercortisolism is 1) inhibition of epidermal cell division and decreased collagen synthesis, and 2) hypokalemia which causes constipation due to decreased bowel motility.[3]

Our patient had evidence of cushingoid state on history, physical exam, and laboratory abnormalities, particularly the profound hypokalemia that was persistently refractory to potassium replacement. Once the diagnosis of Cushing's disease was made and she underwent definitive surgical intervention, her symptoms significantly improved, and the potassium level normalized. She no longer had any gastrointestinal complaints as well, thus supporting that the underlying Cushing's disease was likely contributing to recurrent episodes of diverticulitis.

### *Conclusion*

An elevated cortisol state can have a wide range of clinical manifestations and complications. In a patient with a clinical history and physical exam suspicious for an endocrine disorder and who also presents with lower gastrointestinal abnormalities, it is important to evaluate for Cushing's disease/ syndrome and pursue the appropriate therapeutic intervention to prevent any further gastrointestinal complications.

## REFERENCES


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