Ogilvie Syndrome, Bradycardia, and Neostigmine

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ABSTRACT: Acute colonic pseudo-obstruction (ACPO), known as Ogilvie Syndrome, is an acute dilation of the colon in the absence of an underlying mechanical or anatomic cause. Neostigmine treatment is indicated following failed conservative management of ACPO, however neostigmine has its contraindications. This is a report of a unique case of a patient with a past medical history of symptomatic first degree heart block with a permanent pacemaker who received a bolus dosage of neostigmine treatment for ACPO in an ICU setting.

KEYWORDS: Ogilvie, colonic pseudoobstruction, neostigmine, bradycardia

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Introduction

Acute colonic pseudo-obstruction (ACPO), known as Ogilvie Syndrome, is an acute dilation of the colon in the absence of an underlying mechanical or anatomic cause. It is more commonly seen in men, and often associated with nonoperative trauma, infection, and cardiac disease.[1] It has also been associated with kidney transplantation (more specifically to use of mycophenolate mofetil; immunosuppressant[2] and as well as medications (often related to chemotherapy).[3,4] Neostigmine is proven to be 89.2% effective, as seen in a meta-analysis of 127 patients[5] for Ogilvie Syndrome.

ACPO is diagnosed in approximately 100 cases per 100 000 hospital admissions each year and most commonly occurs in older adults with multiple comorbidities. It has also been reported in healthy patients after traumatic injuries or following surgical procedures.[6]

The primary goal of treatment is urgent bowel decompression, and management options include conservative therapy with observation, pharmacologic intervention, endoscopic therapies, and surgical approaches. The conservative approach is indicated if the cecal diameter is less than 12 cm and the patient is in mild to moderate pain. Following this approach for 72 hours has been documented to have a success rate of up to 90%.[1,7] Medical management with neostigmine is indicated in patients who failed the conservative approach, who have symptoms of ACPO for more than 48 hours, or who have a cecal diameter of more than 12 cm. Neostigmine is a short-acting anticholinesterase inhibitor administered as a 2 to 5 mg slow push over 2 to 5 minutes.[8,9] The average efficacy of one dose is 90%.[10] Suction decompression during colonoscopy and tube placement for external drainage of the cecum is indicated for patients with contraindications to neostigmine therapy or in patients who fail 2 doses of the medical intervention.[9,11,12]

The expected mortality following uncomplicated ACPO is approximately 15%.[1] ACPO can be complicated with evidence of bowel ischemia, peritonitis, or perforation among 3%-15% of patients and is associated with 30%-40% mortality rate.[9]

Case Presentation

This is a case of 75 year old female with past medical history of symptomatic first degree AV block causing bradycardia with a pacemaker in place, diastolic heart failure, coronary artery disease; status post CABG, hypertension, type two diabetes mellitus, and dementia who presented with 3 days of abdominal pain and distention and was admitted.

On initial presentation to the emergency department, the patient was hypokalemic with potassium of 3.2 mEq/L. The remainder of her lab work up was unremarkable. Patient had a heart rate of 79 beats per minute, and blood pressure was 135/66 mm Hg. Computed tomography of the abdomen and pelvis demonstrated worsened colonic distention, as compared to a finding from a prior admission. Patient had received fluid repletion with lactated ringers, as well as electrolyte repletion with potassium, which improved to 4.1 mEq/L by the end of the day. Diet order was kept as "nothing by mouth." Presumptive diagnosis was obstruction secondary to hypokalemia.

On hospital day two, the patient continued to have worsening distention. X-ray demonstrated the maximum diameter of the transverse colon as 12.7 cm (Figure 1). At this time, gastroenterologist deemed that the patient was not a candidate for neostigmine therapy due to a history of heart block, despite having a pacemaker in place with a rationale that in case of malfunction of the pacemaker, neostigmine can induce bradycardia. Patient underwent gastric decompression with nasogastric (NG) tube placement, and flexible sigmoidoscopy was performed. This procedure revealed dilation of the rectum, sigmoid colon, and descending colon.

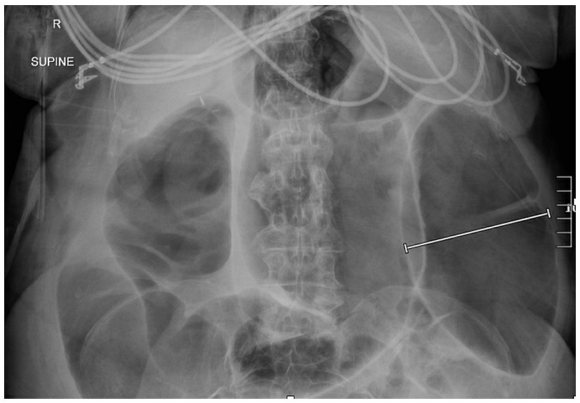

Figure 1. Maximum diameter of the transverse colon as 12.7 cm.

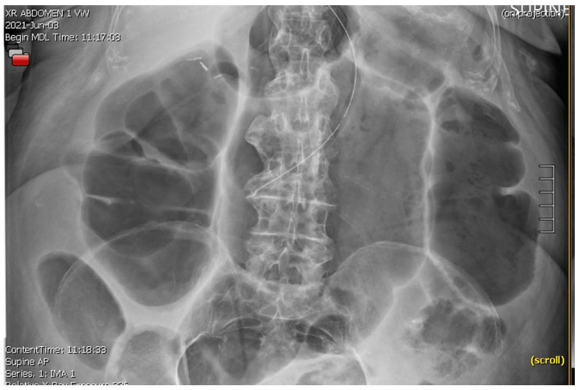

Figure 2. Descending colon measuring to be 8.5 and 4.8 cm.

The patient had a repeat imaging on hospital day three, demonstrating persistent distention of the ascending, transverse, and descending colon. During this time, surgery believed that neostigmine would be more appropriate in the setting of pseudo-obstruction due to Ogilvie's Syndrome. Due to the patient's history of first-degree heart block and placement of cardiac pacemaker, gastroenterology team was concerned for the reasons stated earlier and cardiology was consulted for their further input.

On hospital day four, recommendation was made for the patient to receive neostigmine to help the patient but with special consideration to administer the medication in intensive care unit (ICU) setting for resources to be handy, in case of a need. Anesthesia team was also involved and the patient received neostigmine intravenously 2 mg as a bolus route in the ICU.

The patient had a medium sized bowel movement status post injection and imaging of the abdomen reported a decreased diameter of 9.8 cm in the descending colon. The patient was continued on NG decompression. The patient's vital signs were stable throughout the day, and was transferred back to the regular floor the same day after neostigmine administration. Subsequently, the condition continued to improve on hospital day five to hospital day eight with the descending colon measuring to be 8.5 and 4.8 cm (Figure 2).

Due to the overall decline in quality of life pertaining to dementia, eventually a decision was made to be on comfort. The NG tube was removed and the diet was advanced as tolerated on hospital day 8. The patient was discharged to home hospice on day 9 and had done well for a couple of months.

Discussion

Neostigmine is an acetylcholinesterase inhibitor. All patients should be on a continuous cardiac monitor during its administration and for 30 minutes afterward, and atropine for symptomatic bradycardia should be available per ACLS guidelines.[13] Neostigmine is typically contraindicated in patients with bradycardia, as this is one of the medication's more common side effects.[14] Most studies evaluating patient outcomes post-neostigmine therapy exclude patients with a history of bradycardia.[15] Therefore, little is known about the effect of neostigmine administration on bradycardic patients.

The patient in the present study received a bolus dose of neostigmine intravenously as bolus dosing has been associated with fewer instances of bradycardia.[16] Nevertheless, continuous cardiac monitoring and atropine availability are recommended for patients receiving neostigmine as a precaution if symptomatic bradycardia develops.[17] The ICU provides a relatively controlled environment with capabilities for continuous monitoring, immediate availability of resuscitation equipment, drugs, and personnel to implement intervention if needed.[18]

This case demonstrates administration of neostigmine in a patient with a history of first degree heart block, complicated with bradycardia with a pacemaker in place. The patient received the medication from an anesthesiologist in an ICU setting and was appropriately monitored with telemetry. Atropine was present as a precaution but was not needed because the patient's vitals remained stable and the patient was eventually downgraded to the floor the same day as the procedure. As mentioned earlier, neostigmine is a contraindication when a patient has a history of bradycardia. This case highlighted concerns expressed by the physicians and presence of resistance to using neostigmine, despite having a pacemaker in place. This was solely due to a possibility of a pacemaker malfunction resulting in worse outcomes.

The use of neostigmine in this successful case is unique and warrants further high quality studies to focus on using neostigmine in controlled settings when it is contraindicated or can almost be contraindicated. There is also a need for more research on using neostigmine in unique cases to ensure confidence in its usage is developed to help the patients as there have been no cases documented to use neostigmine, at times of contraindications. This does not necessarily challenge prevailing wisdom but can add to the scientific literature and help cases where there are risks of bradycardia and a need for neostigmine.

Conclusions

This case demonstrates successful management of uncomplicated Ogilvie syndrome using neostigmine in a patient with known higher risk of bradycardia. The authors recommend weighing in risk-benefit when considering contraindications for neostigmine use to relieve colonic pseudo-obstruction administered in controlled ICU

settings. Further high-quality studies are needed to add to evidence in similar scenarios.

Author Contributions

Primary Author:

- Conceived and designed the study: Dr. Asna Tasleem
- Collected and analyzed the data: Dr. Asna Tasleem
- Wrote the initial draft of the manuscript: Dr. Asna Tasleem
- Reviewed and revised the manuscript for intellectual content and provided critical feedback: Dr. Abdul Waheed
- Approved the final version of the manuscript: Dr. Abdul Waheed

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