

## Introduction

- Ventriculoperitoneal (VP) shunt strangulation is a rare complication of VP shunts but requires astute consideration in patients presenting with vague gastrointestinal and neurological symptoms
- VP shunts are commonly used to alleviate elevated intracranial pressure that can result from hydrocephalus whether secondary to trauma or a subarachnoid hemorrhage or from congenital hydrocephalus or normal pressure hydrocephalus
- Occasionally, VP shunts can result in complications such as infection, obstruction or even in rare cases strangulation.

## Case

- A 47-year old male who presented to the emergency department with complaints of headaches, and recurrent abdominal pain associated with nausea and vomiting
- The patient reported prior history of intermittent episodes of sharp abdominal pain located in his lower back and radiating to his abdomen that would occur and resolve without any obvious triggers or alleviating factors
- Initial computed tomography (CT) imaging of the abdomen and pelvis revealed evidence of a dilated small bowel with air-fluid levels and a transition point concerning for a small bowel ileus versus obstruction with the VP shunt coursing through the small bowel loops
- The patient was taken for an exploratory laparotomy and was found to have a small bowel obstruction secondary to strangulation of the VP shunt within the small bowel and associated adhesions

## Medical History

- The patient reported past medical history significant for Gorlin Syndrome with associated hyperparathyroidism and medulloblastoma resulting in surgical resection and VP shunt placement in childhood
- Additionally, patient had reported receiving radiation therapy and a remote "dysfunction" associated with his original VP shunt in childhood that resulted in a surgical revision being performed
- Otherwise, patient had additional comorbidities of hyperlipidemia, and pre-diabetes

## Physical Examination

Patient's initial physical exam was remarkable for abdominal tenderness but otherwise was benign.

## Relevant Imaging

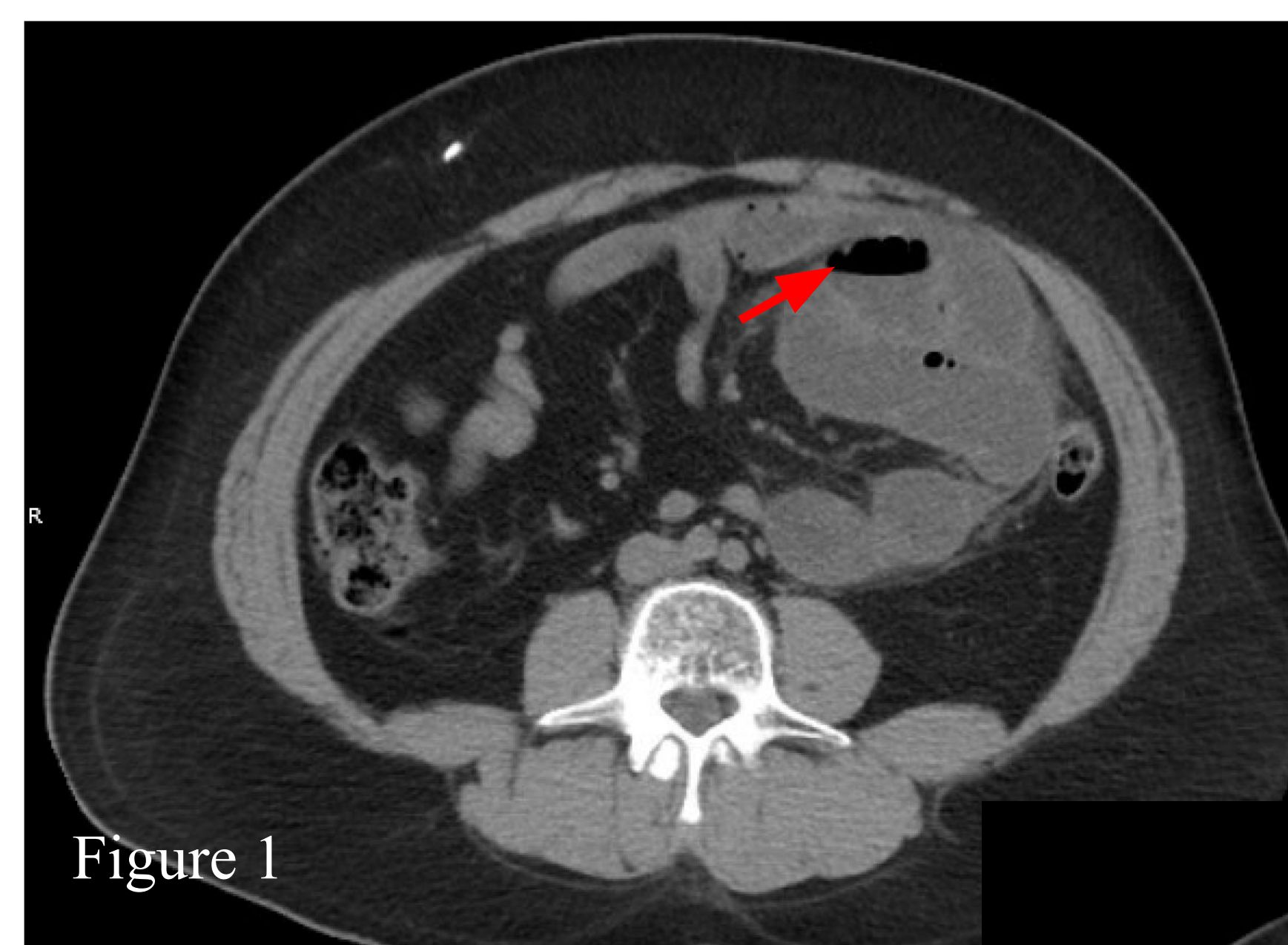


Figure 1

Figures 1 & 2 demonstrate a CT of the abdomen and pelvis revealing air fluid levels at the point of concern regarding the small bowel obstruction as well as the distal course of the VP shunt into the abdomen

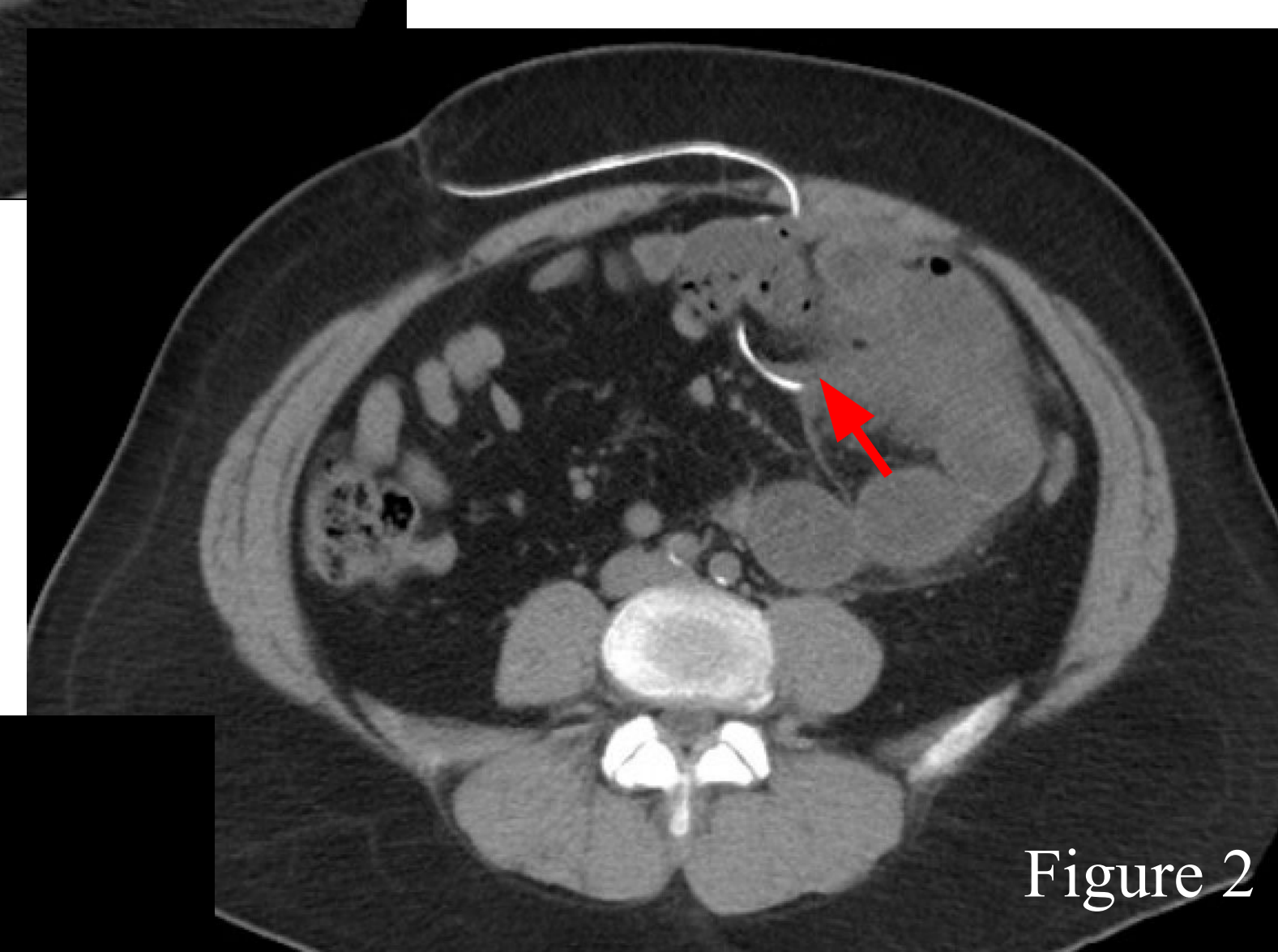


Figure 2

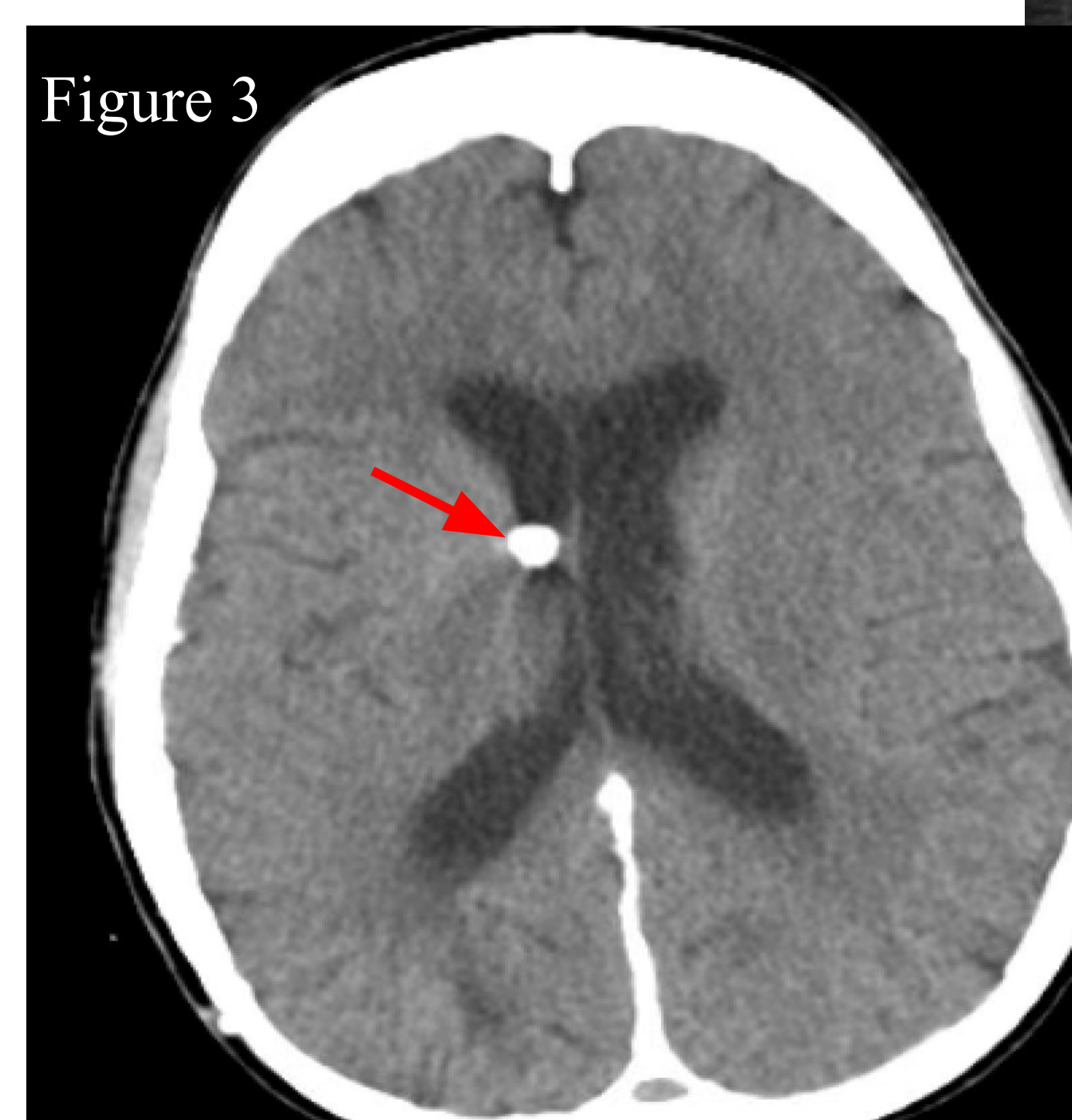


Figure 3

Figure 3 is a CT scan of the brain revealing the origination of the VP shunt and showing no evidence of hydrocephalus

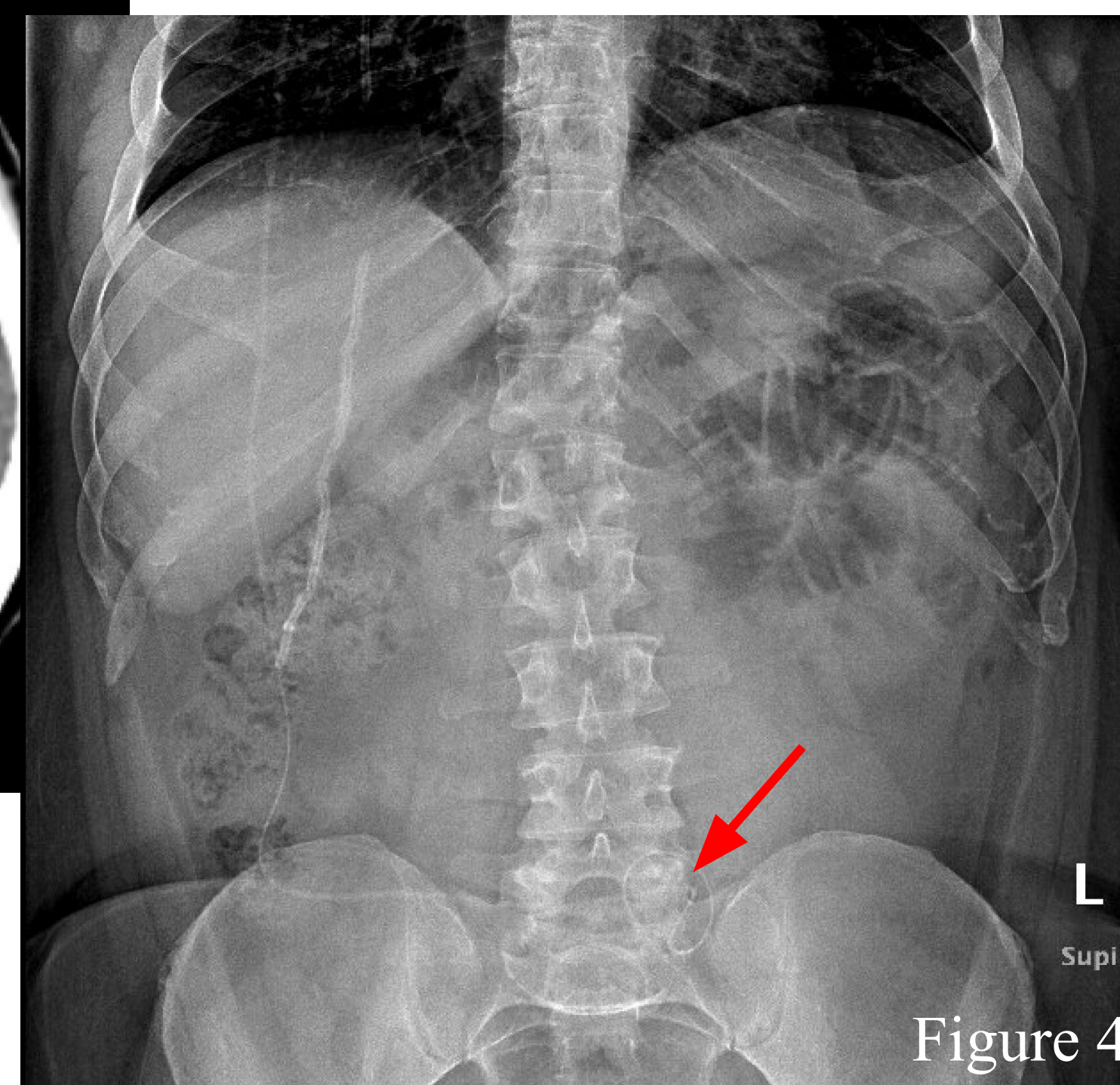


Figure 4

Figure 4 reveals an x-ray of the abdomen showing the course of the VP shunt into the abdomen revealing no obvious deformity of the VP shunt

## Clinical Course

- The patient presented to the hospital with abdominal pain and was noted to have a small bowel obstruction on CT imaging of the abdomen after no obvious deformity of the VP shunt was identified
- Initial conservative measures with nasogastric tube placement and bowel rest did not resolve the patient's pain and surgical intervention was elected
- During surgical intervention it was discovered that the patient had VP shunt strangulation and adhesive disease was noted about the VP shunt and was lysed extensively and the VP shunt was trimmed to prevent further recurrences of VP shunt strangulation

## Discussion

- VP shunts are commonly utilized surgical procedures to treat hydrocephalus, however, complications may occur.
- Neurological symptoms such as headache, dizziness, vision changes and altered mentation may occur
- Abdominal symptoms may be reported as pain, nausea and even vomiting that may obscure the possibility of VP shunt strangulation or occlusion.
- Adhesions to the shunt tubing may result in partial or complete obstruction of the VP tubing
- Early identification and communication between managing teams is crucial in providing an accurate diagnosis and treatment
- Symptoms can be resolved and relapse avoided with surgical intervention and shunt remodeling as seen here

## Conclusion

- As seen in this case presentation, patients may present with vague symptoms of abdominal pain, nausea and vomiting but prompt consideration to possible shunt malfunction or strangulation is crucial
- Suspicion for possible VP shunt strangulation should be further increased when patient's report prior history of revision or prior intra abdominal surgeries reported that increase risk of adhesions
- Many times VP shunt strangulation can be easily confused with normal pressure hydrocephalus, thus prompt imaging is necessary to evaluate for NPH in the form of CT brain imaging
- This case highlights the importance of multidisciplinary approach and consideration to VP shunt malfunction in patients with multiple comorbidities
- As VP shunts are increasingly more common and encountered thus more frequently, larger studies are needed to accurately assess the incidence and management strategies for shunt-related intra-abdominal complications

## References

- Ischemic Bowel Secondary to Ventriculoperitoneal Shunt Knotting: A Surprisingly Rare Complication of Ventriculoperitoneal Shunting. Case Report Joy KA, Szewczyk BS, Adamo MA, Whyte MC. Journal of Neurosurgery. Pediatrics. 2020;25(5):470-475. doi:10.3171/2019.11.PEDS19138.
- Case Report of Mesenteric Strangulation Secondary to Longstanding Ventriculoperitoneal Shunt Catheter. Grant MT, Wilson NA, Keller MS, et al. Child's Nervous System : ChNS : Official Journal of the International Society for Pediatric Neurosurgery. 2021;37(8):2719-2722. doi:10.1007/s00381-020-05019-1.