Case Report

Small cell neuroendocrine carcinoma presenting as inguinal hernia: A case report

Erina Quinn, B.A.* , Natalie Miller, B.A., James Capanegro, B.S., M.M.S, Travis Smith, D.O.

Lake Erie College of Osteopathic Medicine, Bradenton, United States

ARTICLE INFO

Keywords:
Small cell neuroendocrine carcinoma
Inguinal hernia
Metastasis
Case report

ABSTRACT

Introduction: One of the most common surgical procedures performed annually is inguinal hernia repair. Inguinal hernias are traditionally known to be caused by a weakening in the abdominal wall and precipitated by increased intraabdominal pressure. Recently, intra-abdominal cancer producing the increased intraabdominal pressure, along with metastasis directly into the inguinal canal, have been identified in more studies as causes of inguinal hernias.

Presentation of case: This case focuses on a unique presentation of small-cell neuroendocrine carcinoma presenting as an inguinal hernia.

Discussion: This patient’s rapid demise and advanced metastatic disease upon presentation is alarming, but his advanced disease process presenting as a routine inguinal hernia is noteworthy. Upon literature analysis, the number of advanced disease processes—most notably cancer—presenting as hernias is significant.

Conclusion: This case emphasis the importance of perioperative screening, and presents the question, should hernias indicate further workup in the appropriate, at-risk patient populations.

1. Introduction and importance

Surgical repair of inguinal hernias is performed in over 20 million individuals each year [1]. Almost all individuals with inguinal hernias ultimately require surgery. The cause of inguinal hernias is multifactorial, normally due to an increase in intra-abdominal pressure. Several reports have shown inguinal hernia presentation to indicate, intra-abdominal malignancy that is not present in the hernia sac but is solely increasing intra-abdominal pressure precipitating the hernia, or cancer metastasis into the inguinal canal and hernia sac directly [2,3].

Small cell neuroendocrine carcinoma is a highly malignant, poorly defined cancer. There are several case reports discussing a wide variety of metastasis sites for small cell neuroendocrine carcinoma; including metastasis to the intraventricular brain, bone marrow, liver, and many more [4–6]. Metastasis into the inguinal canal or several intra-abdominal metastases presenting as a hernia due to increased pressure is highly likely. We report an abnormal presentation of small cell carcinoma, which is being reported in line with the SCARE criteria [7].

2. Case presentation

A 57-year-old Caucasian man presented for an elective inguinal hernia repair in the operating room of a hospital. Past medical history was significant for chronic back pain with bulging discs and tobacco use. While in the preoperative holding area, he was found to be in atrial fibrillation with rapid ventricular response of 190 bpm. Following administration of intravenous labetalol, the heart rate and blood pressure fell to 160 bpm and 80/60 mmHg, respectively. Intravenous administration of heparin and digoxin were initiated. He denied any past cardiac medical history but stated that his heart rate runs fast and fluctuates throughout the day. He admitted that in the past few weeks he had noticed increasing back pain and shortness of breath on physical exertion. He noticed that his inguinal hernia had become more pronounced.

Due to the atrial fibrillation with rapid ventricular response the inguinal hernia repair was postponed pending additional cardiac workup. Laboratory studies demonstrated low RBCs at 3.56 K/mcl, low hemoglobin at 10.8 g/dL, and low hematocrit at 32.8%. CMP showed a slightly low chloride level at 97 mEq/L. There was a low albumin level at 2.6 g/dL, and the albumin to glucose ratio was low at 0.6. The alkaline phosphatase was elevated at 906 intUnit/L, aspartate aminotransferase...
and alanine aminotransferase were both high at 121 intUnit/and 72 intUnit/, respectively. Iron studies showed low transferrin at 123 mg/dL and TIBC at 183 mcg/dL, and an elevated iron saturation at 85% and ferritin at 5,953 ng/mL. Special studies showed the folate level was low at 3.7 ng/mL and the vitamin B12 was elevated at 1,448 pg/mL.

The patient was still in atrial fibrillation, despite maximum dose of IV diltiazem and digoxin. The patient’s severe back pain was most likely also contributing to the tachycardia. An echocardiogram showed the left ventricular ejection fraction to be 60%, with mild to moderate mitral regurgitation. Mild tricuspid regurgitation correspondingly slightly elevated pulmonary pressures of 30 mmHg. A CT angiogram of chest, abdomen and pelvis with and without contrast showed an infiltrative soft tissue mass with the size 8.7 cm × 8 cm × 12 cm, in the right anterior mediastinum infiltrating the right pericardium surrounding the right main pulmonary artery and the right mainstem bronchus with displacement of the superior vena cava to the right. There were abnormal pulmonary masses in the right upper lung with pleural thickening and a large right pleural effusion and a small left pleural effusion. There was also hepatomegaly with multifocal, ill-defined areas suspicious for metastatic disease (Fig. 1). There was also portohepatic and peri-aortic adenopathy noted. Computed tomography demonstrated a small amount of fluid in the pelvis and a lytic lesion in the left iliac wing.

An abdominal ultrasound was done, which showed multiple nodules in the liver, further indicating metastatic disease, and a left pleural effusion. The pleural fluid was positive for malignancy with small cell carcinoma malignant cells, abundant lymphocytes and reactive mesothelial cells. A thoracentesis was performed and successfully drained 1500 mL of fluid. After the thoracentesis, the patient converted to normal sinus rhythm. A liver biopsy confirmed metastatic small-cell neuroendocrine carcinoma with a 2.4 cm × 3.0 cm × 3.3cm mass.

On the 4th day of admission, an EKG showed sinus tachycardia and atrial premature complexes. There was a baseline artifact and ST changes were indeterminate. A second EKG was performed 8 hours later and showed atrial fibrillation with rapid ventricular rate, an indeterminate axis with low voltage in the extremity leads. A chest x-ray was performed and showed a persistent right hilar mass with right pleural effusion and right upper lung opacity consistent with previous imaging.

On the 5th day of admission, the rapid response team was called when the patient had increased respirations and mild confusion. A stat ABG showed a pH of 7.48, CO2 was low at 28.9 mmHg, O2 was high at 111 mmHg, bicarbonate was low at 21.4 mmHg. A brain CT without contrast was performed and had no acute intracranial pathology. A CT of the abdomen showed consistent results with the previous CT and new, recurrent small left pleural effusion. A second thoracentesis removed 1000 mL of pleural fluid. A few hours later, with lactic acid at 3.3 mmol/L, and 10 hours later increased to 7.8 mmol/L, the patient became progressively lethargic, though breathing evenly and unlabored, with slight tachypnea. He awoke to voice quickly but fell back to sleep immediately and only answered questions intermittently. A second ABG was ordered and showed an improved pH of 7.43, but a lower CO2 of 25.3 mmHg, higher O2 of 131 mmHg, and even lower bicarbonate of 17 mmHg. The patient was alert, but not able to respond to commands and confused. Five hours later the patient passed away.

3. Clinical discussion

This patient’s presentation of metastatic disease and rapid decline is alarming, but the presentation of his widespread metastatic disease precipitating his inguinal hernia is noteworthy. When reviewing the literature, the number of cases of cancer, of various types, presenting as hernias is significant [2,3,8,9]. With our patient it is suspected that the combination of the extreme hepatomegaly and free pelvic fluid increased the intra-abdominal pressure instigating the inguinal hernia. Unfortunately, there was no pathology report done on the inguinal canal contents in our patient, therefore it is uncertain if metastasis was present within the hernia sac.

Although the patient stated no prior cardiac issues, his history shows that there may have been cardiac issues over the past few years. The most likely cause of the persistent atrial fibrillation (AF) in this patient was the metastatic invasion into the pericardium and right main pulmonary artery, and extra-mediastinal compression from massive bilateral pleural effusions. These two factors likely altered the heart’s normal architecture enough to stretch the conducting system of the heart resulting in arrhythmia [10]. After the thoracentesis, the AF resolved supporting the metastatic nature of the condition.

It does raise the question, should there be further screening for malignancies, in the proper populations, upon hernia presentation. Surgeons often request colonoscopy screenings for patients prior to hernia repair due to the increased incidence of colon cancer in those with hernias [11]. This has become commonplace, and it is worth considering the presence of other cancers with the presentation of hernias. Between the evidence of cancer increasing intra-abdominal pressure and precipitating hernias, and several other reports of cancer being present in the inguinal canal upon hernia repair, further investigation is indicated for the relationship between inguinal hernias and intra-abdominal cancer and metastasis.

4. Conclusion

This was an interesting case in which late metastatic small cell lung carcinoma was found to be causing an inguinal hernia. The hernia was not repaired and the tissue in the hernia sac was not biopsied due to perioperative onset of atrial fibrillation (AF) and the rapid decline of the patient. It is surmised that elements of hepatomegaly and ascites, due to metastatic disease, resulted in an increased intraabdominal pressure.

![Fig. 1. CT of the Abdomen shows the extreme hepatomegaly from metastasis of the small cell carcinoma. A. Coronal CT scan of the abdomen shows a 236.6 mm Liver. B. Cross-sectional CT scan of the liver shows a 165.5 mm Liver.](image_url)
precipitating the hernia. Although unconfirmed via biopsy it was suspected that metastasis was present within the hernia sac. This exemplifies the importance of perioperative screening and how a common finding, inguinal hernia, can lead to an unexpected outcome when further investigated, such as metastatic cancer.

Ethical approval

N/A.

Source of funding

No sources of funding.

Author contribution

Erina Quinn: Corresponding author, literature review, data analysis, data collection, writing.
Natalie Miller: literature review, data analysis, writing.
James Capanegro: literature review, data analysis, writing.
Travis Smith D.O.: literature review, data analysis, final approval for submission.

Research registration number

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

Guarantor

Erina Quinn.

Consent

No consent was obtained since the patient was deceased and the family members were untraceable. Consent was unable to be obtained from family members as the patient’s next of kin was contacted with no response.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

All authors have completed the ICMJE uniform disclosure form. The authors have no conflicts of interest to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2021.102310.

References

[1] A. Kingsnorth, K. LeBlanc, Hernias: inguinal and incisional, Lancet 362 (2003) 1561–1571, https://doi.org/10.1016/S0140-6736(03)14746-0.
[2] J. Janez, M. Taskovska, Metastatic sigmoid colon cancer presented as incarcerated inguinal hernia–case report, Int. J. Med. Pharm. Case Reports. 9 (2017) 1–5, https://doi.org/10.9734/UMPCR/2017/34210.
[3] R. Qin, Q. Zhang, J. Weng, Y. Pu, Incidental finding of a malignant tumour in an inguinal hernia sac, Contemp. Oncol. 18 (2014) 130, https://doi.org/10.5114/wo.2014.42726.
[4] H. Chen, H.K. Raza, H. Shi, J. Zhu, G. Cui, A rare case of small cell carcinoma of lung with intraventricular metastasis, Br. J. Neurosurg. 33 (2019) 261–263, https://doi.org/10.1080/02688697.2017.1327020.
[5] I. Kawashima, H. Fukasawa, K. Kasai, T. Kumagai, M. Koshiishi, K. Nakajima, T. Kondo, A. Hashi, S. Hirata, K. Kirito, Bone marrow invasion of small cell neuroendocrine carcinoma of the endometrium: a diagnostic pitfall mimicking a haematological malignancy, Intern. Med. (2019), https://doi.org/10.2169/internalmedicine.2533-18, 2533-18.
[6] Y.J. Liu, K.F. Ng, S.C. Huang, R.C. Wu, T.C. Chen, Composite hepatocellular carcinoma and small cell carcinoma with early nodal metastasis: a case report, Medicine 96 (2017), https://doi.org/10.1097/MD.000000000007868.
[7] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE Group, The SCARE 2020 guideline: updating consensus surgical Case REport (SCARE) guidelines, Int. J. Surg. 84 (2020) 226–230.
[8] P. Chatzipantelis, E. Kairi-Vassilatoul, V. Smyrniotis, A. Pafiti, Incidental finding of a malignant peritoneal mesothelioma in an inguinal hernia sac: report of a case, Eur. J. Gynaecol. Oncol. 27 (2006) 534–536.
[9] T.P. Burke, P. Waters, W. Khan, K. Barry, Bilateral saccular inguinal hernias in an elderly woman presenting with advanced ovarian cancer, Case Reports (2014), https://doi.org/10.1136/bcr-2013-202337.
[10] Mechanisms of atrial fibrillation. https://www-uptodate-com/mechanisms-of-atrial-fibrillation/ , 2021. (Accessed 8 February 2021). Reference to a dataset: Olshansky, B., MD, & Arora, R., MD. (2019, October 22).
[11] B. Avidan, E. Bardan, A. Lang, H.H. Fidder, Y. Chowars, S. Bar-Meir, Colorectal cancer screening in patients presenting with an inguinal hernia: is it necessary? Gastrointest. Endosc. (2004) 369–373, https://doi.org/10.1016/S0016-5107(03)02715-9.

3