

**CASE REPORT***Volume 10 Issue 4**Long-Term Survival After Metastatic Pancreatic Cancer***Joshua Keefer, MD<sup>1</sup>, Mark Cooper, MD<sup>1</sup>, Toni Pacioles, MD<sup>1</sup>,  
Amanda Arrington, MD<sup>2</sup>****ABSTRACT**

Pancreatic adenocarcinoma is an aggressive cancer with poor outcomes regardless of resection and treatment. The 5-year survival rate is less than 10%. Even with proper resection of the primary tumor, there remains a high likelihood of recurrence within 20 months. This is the case of a patient who was diagnosed with pancreatic adenocarcinoma 7 years ago. This patient underwent resection of the primary tumor along with chemotherapy and radiation. Two recurrences, located in the lung, have both been resected. This case highlights the importance of prompt resection and regular surveillance to monitor for additional metastases.

**KEYWORDS**

survival; metastatic pancreatic cancer; metastasis; Folfirinox

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**INTRODUCTION**

The aggressive nature of pancreatic adenocarcinoma results in a 5-year survival rate of less than 10%.<sup>1</sup> An important factor determining poor prognosis is the lack of signs or symptoms of the malignancy. Due to the anatomic location of the pancreas in the retroperitoneal space, there is unlikely to be an overt palpable mass that can be felt on examination. This contributes to the fact that 90% of these malignancies are diagnosed in the late stages with a high likelihood of distant metastases.<sup>2,3</sup>

Metastatic disease is prevalent with pancreatic cancer and significantly worsens the prognosis. The 5-year survival rate drops to 3% in patients with known metastases. The most frequent locations of metastasis are the liver, lung, lymph nodes, and peritoneal seeds. Patients with no evidence of metastatic disease can undergo a Whipple procedure to remove the primary tumor. Surgical resection is the only potential treatment with any evidence of curability; successful resection results in an increase of 5-year survival to 25%. Unfortunately, only 15 to 20% of individuals who are diagnosed are indicated for surgical

resection.<sup>4</sup> Individuals not indicated for surgery include those who do not have distant metastasis, arterial contact with the celiac artery, superior mesenteric artery, or the common hepatic artery. Individuals similar to the patient in this case who are indicated for resection still have a 76.7% risk for recurrence after 2 years.<sup>5</sup> The remaining individuals must rely on other medical treatments that could allow them to become candidates for resection.

The mainstay chemotherapy regimen is composed of Gemcitabine with nab-paclitaxel and FOLFIRINOX. This regimen can lower the tumor burden to allow for resection 30% of the time.<sup>4</sup> A recent randomized clinical trial conducted out of France and Canada compared FOLFIRINOX and Gemcitabine in patients who had undergone resection of Pancreatic Ductal Carcinoma. The primary outcome of the trial was disease-free survival. The use of FOLFIRINOX yielded more favorable results in survival when compared to Gemcitabine. There was a significant difference in the median disease-free survival (21.4 vs. 12.8 months) and overall 5-year survival (26.1% vs. 19%).<sup>6</sup> The concurrent use of radiotherapy with chemotherapy has significantly improved the local tumor burden



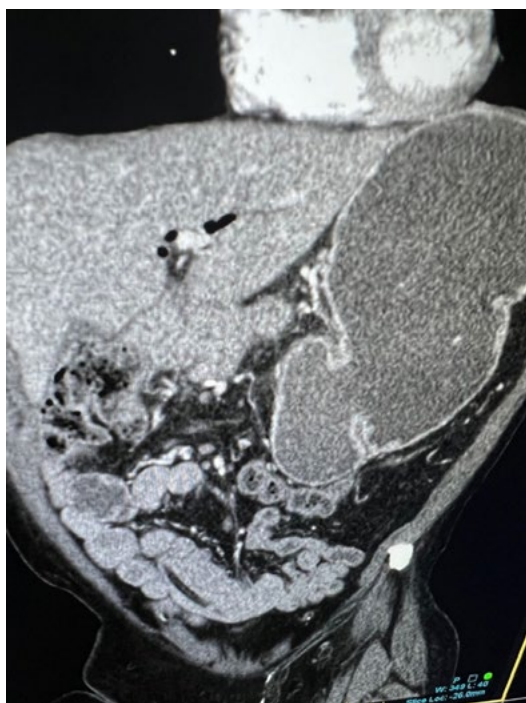
when compared with chemotherapy alone. Using systemic chemotherapy prior to beginning radiation allows for sensitization of the tumor to radiation.<sup>4</sup> Intensity-modulated radiotherapy has shown better outcomes in survival. This modality allows for a higher concentration of radiation directed toward the tumor while mitigating the radiation dose affecting the surrounding tissues. Therefore, higher doses of radiation target the tumor.<sup>4</sup>

Even if the tumor has been resected with no evidence of nodal involvement or metastases, the 5-year survival rate is only 25%.<sup>7</sup> Given the statistically late diagnosis and poor prognosis of this malignancy, it is essential to document cases that defy these odds to influence future treatment and management of pancreatic cancer. This report details a resected pancreatic adenocarcinoma with multiple lung metastases 5 and 7 years post-resection of the primary tumor.

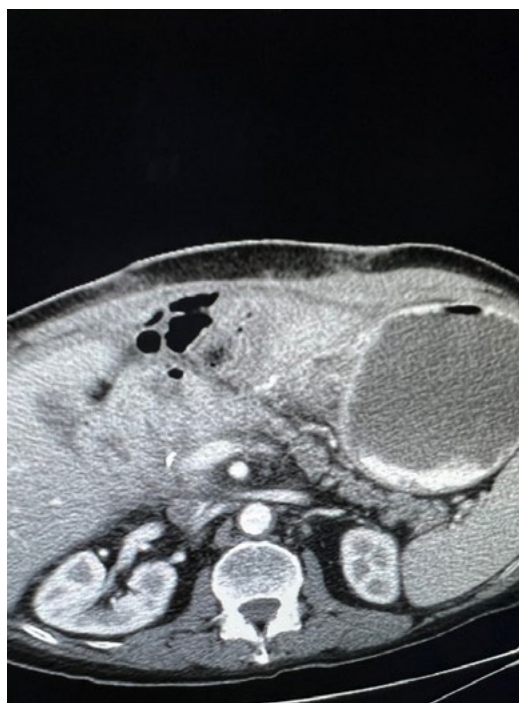
## CASE REPORT

Informed consent was obtained from this patient. The patient is a 79-year-old male who was diagnosed with pancreatic adenocarcinoma with

lymph node metastasis in September 2015. He presented with significant weight loss and painless jaundice, which warranted hospitalization. His lab results revealed significant hyperbilirubinemia and elevated CA19-9. These results, paired with his physical symptoms, led his care team to order an endoscopic ultrasound that showed a 2 cm mass with poorly defined borders in the head of the pancreas (Figures 1 and 2). A biopsy revealed atypical cells. The attending surgeon discussed the high diagnostic likelihood of pancreatic cancer and explained the options to the patient. He elected to pursue the recommended surgical treatment. The patient underwent an exploratory laparotomy with a pancreaticoduodenectomy, cholecystectomy, and a G-tube placement. Nineteen regional lymph nodes were excised; only 1 was positive. The pathologic staging of the tumor in the pancreatic head was pT2n1M0. The patient underwent systemic chemotherapy with 2 cycles of Gemcitabine in October 2015. Concurrent chemoradiotherapy followed for 1 month. After the radiotherapy, Gemcitabine followed the treatment, which was completed in June 2016. Surveillance CT scans monitored for reoccurrence after chemotherapy and concurrent radiation.



**FIGURE 1:** 2015. Coronal view of computed tomography of the abdomen pelvis demonstrating a mass in the head of the pancreas.



**FIGURE 2:** 2015. Axial view of computed tomography of the abdomen pelvis demonstrating a mass in the head of the pancreas.

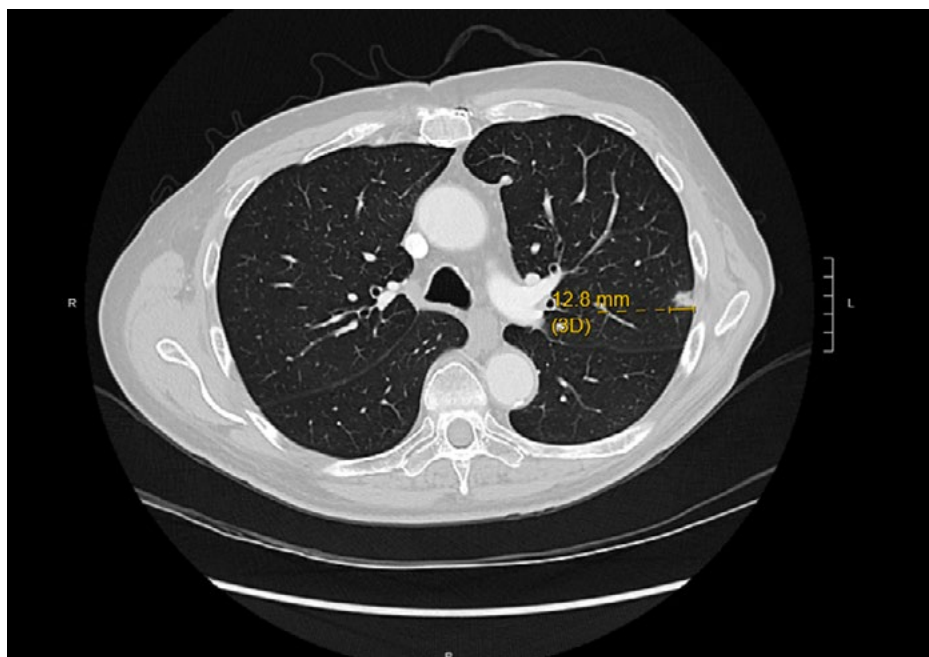


On January 31, 2020, a small nodule with cavitation was present on a CT chest scan. The mass was located within the pleura of the lateral left upper lobe. The scans were discussed with the patient, who elected to forego the biopsy and monitor it with a follow-up scan. The following CT scan was done in August 2020 and showed an enlargement of the nodule (Figure 3). The patient elected to undergo a left upper lobe wedge resection, which showed that the nodule was metastatic pancreatic adenocarcinoma. The cancer had reached stage IV, and chemotherapy was recommended, but the patient elected to forego treatment. He did agree with follow-up CT scans to monitor for any new metastases. The patient did well with no other signs of metastases up until July 25, 2022. CT scans of the chest showed an enlarging left upper lobe nodule. Options were discussed with the patient, who agreed to undergo another wedge resection of the mass. The bronchoscopy did not show any endobronchial lesions. A pulmonary nodule was resected along with an adjacent rib with no complications during the procedure. The patient is not undergoing chemotherapy. The patient has been discharged from the hospital and will continue to follow up with his oncologist and surgeon.

## DISCUSSION

Pancreatic ductal adenocarcinoma has an extremely high 5-year mortality rate of 90% due to many factors, including the slow onset of symptoms.<sup>1</sup> This patient has defied these odds, surviving 7 years since his diagnosis. The authors attribute these results to a timely resection of the primary cancer and routine medical surveillance for further metastases. Due to routine imaging, doctors were able to localize the 2 distant metastases to the lungs and excise them promptly. Along with the surgical treatment, this patient underwent chemotherapy and radiation after the primary cancer was surgically removed.

A primary factor for this malignancy's high mortality rate is that a large majority of patients are not diagnosed until it has metastasized elsewhere.<sup>2</sup> Screening for this type of cancer is not as routinely performed because it only accounts for 3% of new cancers in the United States. Unlike a colonoscopy for colorectal cancer, pancreatic cancer has no sufficient screening tests for detection. Individuals who are screened routinely have inherited mutations that put them at an increased risk of being



**FIGURE 3:** Axial view of computed tomography of the chest demonstrating a 12.8 mm pulmonary mass in the periphery of the upper lobe of the left lung.



diagnosed with this cancer. Individuals who are at a 5% risk of developing pancreatic cancer are qualified to undergo medical surveillance.<sup>2</sup>

Treatment options for pancreatic adenocarcinoma are dependent on the stage of the disease. The 3 main categories determining treatment are based on the ability to resect the tumor. Neoadjuvant chemotherapy can be used to lower the tumor burden prior to resection. The current standard of care is complete resection of the primary tumor with systemic chemotherapy 4 to 8 weeks postoperatively. The standard chemotherapy is Gemcitabine with paclitaxel, which this patient received. FOLFIRONOX can also be used as a first-line treatment.<sup>2</sup>

Most patients who undergo resection have a recurrence of cancer within 2 years. Even after surgical resection, the 5-year survival rate is just 11-25%. However, this rate has increased since 1984 when it was only 3%. The reason for the increase in survival rate is multifactorial, involving better surgical procedures as well as advanced chemotherapy. Another critical factor for this improvement is the strict follow-up visits to monitor for distant metastases. The only way to overcome the high recurrence rate is to use regular surveillance studies to find and treat distant metastases early. Fortunately, the metastases of the patient presented in this case could be resected. Many studies have shown that surgical margins and tumor size play a significant role in the survival rate after resection.<sup>8</sup> The median survival duration after resection is just 20 months with adjuvant chemotherapy and even less without chemotherapy.<sup>9</sup>

## CONCLUSION

The primary takeaway from this case report is for physicians and patients to understand the importance of surveillance screening after a diagnosis of pancreatic cancer. Although the 5-year survival rate is as low as 11%, it does not negate the possibility of defying the odds, similar to the patient in this case. Medical teams must join together to ensure the patient can adequately treat this daunting diagnosis. Regular surveillance in remission will detect distant metastases early, which can often be treated with resection, similar to the patient in

this case. Current research is driven by learning and understanding the biology behind tumor growth to produce treatment modalities more focused on biological characteristics.<sup>2</sup> Screening patients at a higher risk due to genetic mutations may lead to better prognoses. The importance of timely resection and routine surveillance for further metastases is displayed in this case.

## INFORMED CONSENT

Informed consent was obtained from this patient.

## CONFLICTS OF INTEREST

The authors declare there are no conflicts of interest.

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## REFERENCES

1. Puckett Y, Garfield K. Pancreatic Cancer. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan. <https://www.ncbi.nlm.nih.gov/books/NBK518996/>
2. Wood LD, Canto MI, Jaffee EM, Simeone DM. Pancreatic Cancer: Pathogenesis, Screening, Diagnosis, and Treatment. *Gastroenterology*. 2022;163(2):386-402.e1. doi:10.1053/j.gastro.2022.03.056
3. Mizrahi JD, Surana R, Valle JW, Shroff RT. Pancreatic cancer. *Lancet*. 2020 Jun 27;395(10242):2008-2020. doi: 10.1016/S0140-6736(20)30974-0. PMID: 32593337.
4. Barcellini A, Peloso A, Pugliese L, Vitolo V, Cobianchi L. Locally Advanced Pancreatic Ductal Adenocarcinoma: Challenges and Progress. *Onco Targets Ther*. 2020;13:12705-12720 <https://doi.org/10.2147/OTT.S22097>
5. Principe DR, Underwood PW, Korc M, Trevino JG, Munshi HG, Rana A. The Current Treatment Paradigm for Pancreatic Ductal Adenocarcinoma



and Barriers to Therapeutic Efficacy. *Front Oncol.* 2021;11:688377. Published 2021 Jul 15. doi:10.3389/fonc.2021.688377

6. Thierry Conroy, MD. Five-Year Outcomes of FOLFIRINOX vs Gemcitabine as Adjuvant Therapy for Pancreatic Cancer. *JAMA Oncology* 2022;8(11):1571-1578.
7. Ayres Pereira M, Chio IIC. Metastasis in Pancreatic Ductal Adenocarcinoma: Current Standing and Methodologies. *Genes (Basel)*. 2019 Dec 19;11(1):6. doi: 10.3390/genes11010006. PMID: 31861620; PMCID: PMC7016631.
8. Yamamoto T, Yagi S, Kinoshita H, et al. Long-term survival after resection of pancreatic cancer: a single-center retrospective analysis. *World J Gastroenterol.* 2015;21(1):262-268. doi:10.3748/wjg.v21.i1.262
9. Heye T, Zausig N, Klauss M, et al. CT diagnosis of recurrence after pancreatic cancer: is there a pattern?. *World J Gastroenterol.* 2011;17(9):1126-1134. doi:10.3748/wjg.v17.i9.1126

