

Vanishing liver metastases in pancreatic cancer: A case report

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Abstract. Metastatic pancreatic cancer carries a poor prognosis, with palliative chemotherapy offering limited survival benefit and conversion to resectability considered rare. The present study reports the case of a 60-year-old woman with pancreatic adenocarcinoma and extensive liver metastases treated with palliative FOLFIRINOX, achieving complete radiological disappearance of hepatic disease and sustained control of the primary tumour. After a treatment pause and subsequent reinitiation of chemotherapy for local progression, the liver metastases remained absent. At 32 months post-diagnosis, the patient underwent pancreatic resection with negative margins and remains alive and free from hepatic recurrence 84 months from diagnosis. This case highlights that select patients may achieve long-term survival through individualized, multimodal treatment strategies.

Introduction

Pancreatic cancer is an aggressive malignancy with a poor prognosis (1,2). Approximately 80-85% of newly diagnosed patients present with either unresectable or metastatic disease, depriving them of the only potentially curative option-upfront surgical resection (1-3). Liver metastases are present in nearly 50% of cases and are associated with dismal outcomes, often measured in weeks to a few months (1). As a result, metastatic pancreatic cancer is generally considered untreatable.

Palliative chemotherapy provides modest survival benefit, with overall survival ranging from 8.5 to 10 months depending on the regimen used (1,2). The longest survival is observed with the FOLFIRINOX regimen (fluorouracil, folinic acid,

irinotecan, and oxaliplatin) (1,2). In cases of locally advanced pancreatic cancer, FOLFIRINOX is employed with the aim of conversion to resectability, which has been achieved in up to 25.9% of patients (4).

However, in the metastatic setting, particularly with widespread liver involvement, conversion to surgery is not considered feasible, and no established treatment pathway exists. Rare cases demonstrating exceptional response to systemic therapy, such as the one presented here, remain anecdotal but raise important questions about tumour biology, treatment sequencing, and the future of personalized oncology in this disease.

Case report

In September 2018, a 60-year-old female was diagnosed with a poorly differentiated pancreatic body tumour and multiple liver metastases (Figs. 1 and 2). The patient initially presented at Derby Teaching Hospitals in United Kingdom and was referred to King's College Hospital, London, for tertiary Hepato-Pancreato-Biliary evaluation at a later stage.

The diagnosis was confirmed by endoscopic ultrasound-guided biopsy of the pancreatic mass. FOLFIRINOX chemotherapy was initiated in October 2018 with palliative intent. Given the radiological appearances strongly suggestive of liver metastases, no histological confirmation of the liver lesions was pursued, reflecting common clinical practice in the absence of features suggestive of sepsis or diagnostic doubt.

After 6 months of chemotherapy, in April 2019, imaging revealed significant response at both the primary site and within the liver, where lesions were now barely detectable (Fig. 3).

This finding persisted on serial imaging throughout continued systemic therapy and surveillance for more than two years. Subsequent FDG-PET imaging demonstrated no abnormal hepatic metabolic activity (Figs. 4, 5 and 6). At surgical exploration, no macroscopic liver lesions were identified, and therefore no intraoperative biopsies were performed.

By August 2019, following a total of 19 cycles of FOLFIRINOX, repeat imaging demonstrated near-complete resolution of both the pancreatic mass and hepatic metastases. The patient was subsequently enrolled in a clinical trial investigating a cancer vaccine and received two doses, administered four weeks apart. At her request, chemotherapy was paused.

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Key words: metastatic pancreatic cancer, FOLFIRINOX, palliative chemotherapy, liver metastases, pancreatic adenocarcinoma, surgical resection, long-term survival, pathologic complete response

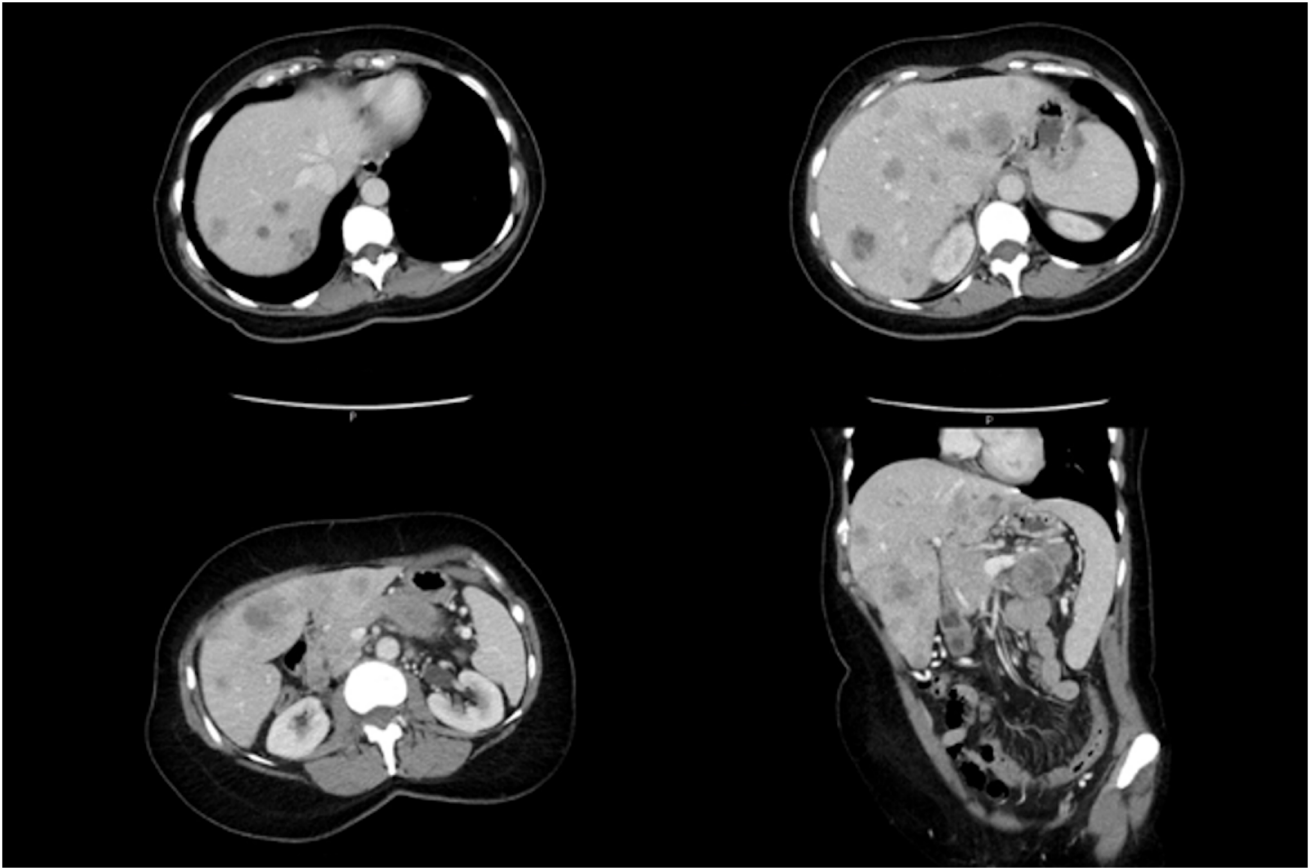


Figure 1. CT at presentation (September 2018) showing multiple hepatic lesions consistent with metastases.

The case was referred to the Hepato-Pancreato-Biliary (HPB) multidisciplinary team (MDT) at our tertiary centre for assessment of surgical resectability. Upon reviewing the initial and subsequent imaging, the MDT acknowledged the extraordinary radiological response. However, surgery was deemed inappropriate at that time due to the initial burden of hepatic metastatic disease. Surveillance under local oncology follow-up was recommended.

After a 15-month chemotherapy-free interval, restaging scans demonstrated sustained disease stability, leading to resumption of FOLFIRINOX in December 2020. The patient subsequently completed 12 additional cycles, with the final 4 cycles administered at a reduced dose (60%).

In June 2021, both CT and FDG-PET imaging confirmed complete radiological and metabolic response at both the primary and metastatic sites (Fig. 7). Following MDT discussion and given the sustained disease stability, the patient was deemed suitable for surgical exploration.

In August 2021, she underwent laparotomy. No macroscopic evidence of metastatic liver disease was identified intraoperatively. A left pancreatectomy with splenectomy was performed.

Final histopathology revealed a 20 mm pancreatic ductal adenocarcinoma arising in a 50 mm high-grade intraductal papillary mucinous neoplasm (IPMN) of pancreatobiliary subtype. There was infiltration of the splenic vein, and 1 of 9 resected peripancreatic lymph nodes contained metastatic disease. The pancreatic duct showed low-grade dysplasia at the margin, but

there was no high-grade dysplasia or invasive cancer. Resection margins were negative. Final staging was ypT2 pN1 (1/9) LV1 PN0 R0. Representative haematoxylin and eosin-stained sections are shown in Fig. 8, demonstrating viable residual pancreatic ductal adenocarcinoma following systemic chemotherapy.

The postoperative course was uneventful.

The patient was monitored with 6-monthly interval CT scans. She did not receive further adjuvant chemotherapy. As of the most recent follow-up, she remains alive and disease-free 84 months (7 years) after her initial diagnosis and 4 years post-resection (Fig. 9). A timeline summarising the disease course is presented in Table I.

Discussion

Pancreatic cancer was the fourth leading cause of cancer-related deaths in the USA and Europe based on 2018 data and is projected to become the leading cause by 2030 (4). Metastatic pancreatic cancer (mPC) accounts for approximately 50% of cases at diagnosis, with a reported 5-year survival rate of just 3% in this group (4).

Invasive pancreatic cancer arising from intraductal papillary mucinous neoplasm (IPMN) has been shown to confer improved overall survival in resected patients, with 5- and 10-year survival rates of 72 and 62%, respectively (5). However, survival data specific to metastatic IPMN-associated pancreatic cancer remain unavailable, as these cases are typically grouped under the broader mPC category (5).

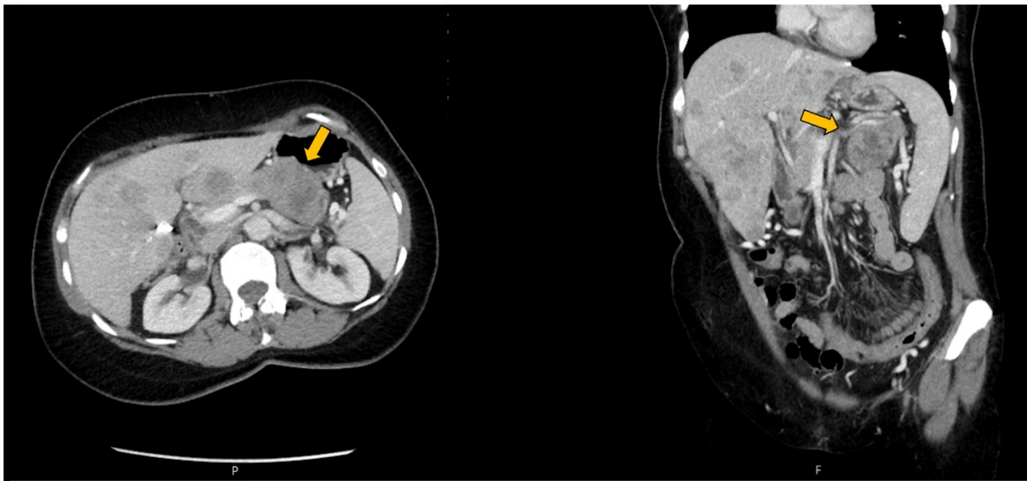


Figure 2. CT at presentation (September 2018) demonstrating the primary tumour in the pancreatic body (yellow arrow).

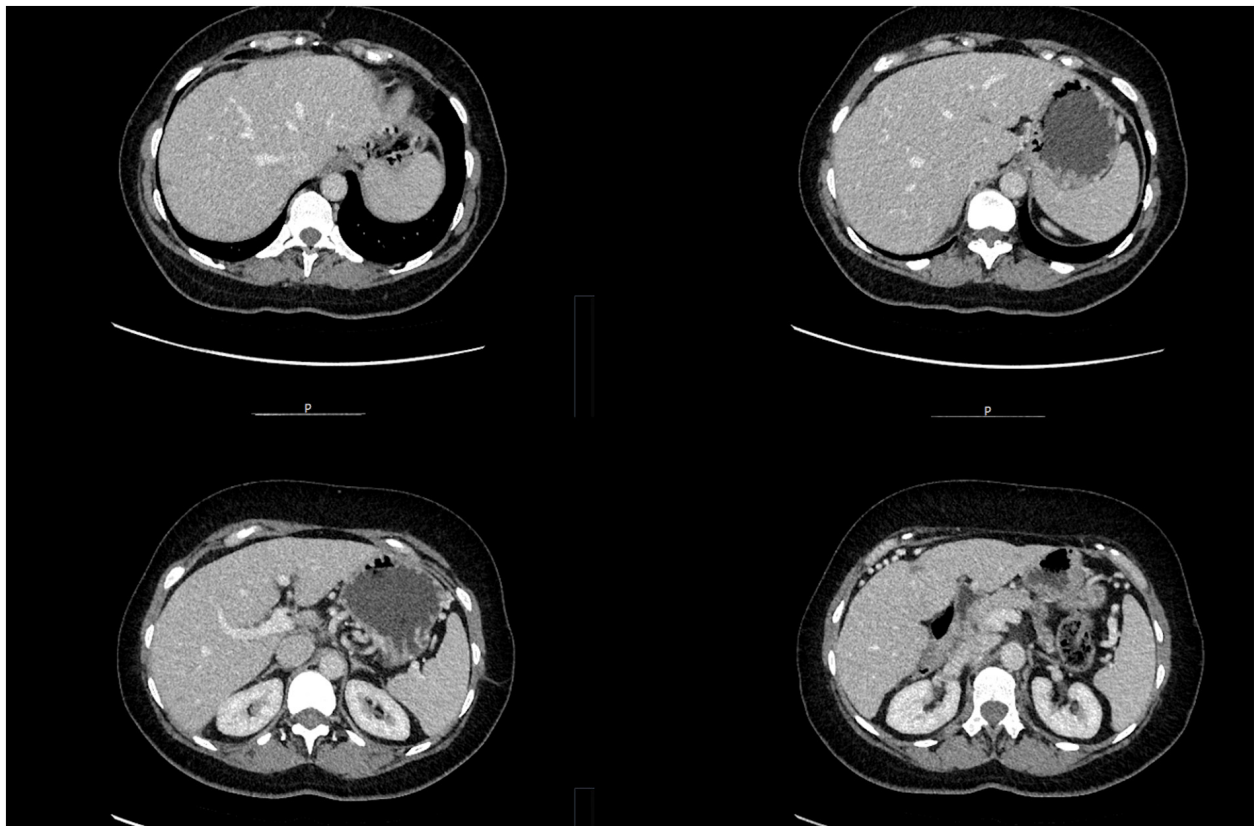


Figure 3. Disease response. CT following 6 months of chemotherapy (April 2019) shows regression of the primary pancreatic body tumour and no radiologically detectable liver lesions.

Long-term survivors with mPC are exceedingly rare and have been sparsely reported in the literature (6,7). FOLFIRINOX was the chemotherapeutic regimen used in most reported cases, although modifications, particularly reducing or omitting oxaliplatin, were often necessary due to adverse effects (7,8). One such survivor was BRCA1-positive with a history of multiple malignancies (7). In a striking case reported by Balta *et al* (6), multimodal treatment including chemotherapy, radiotherapy, transhepatic arterial chemoembolization (TACE), radiofrequency ablation (RFA) for a renal

deposit, pancreaticoduodenectomy, liver wedge resection, Cyber-Knife radiosurgery, and repeated genomic analysis enabled nearly 5 years of survival. This underscores how a tailored combination of treatments can achieve prolonged survival and quality of life in a disease typically considered rapidly fatal.

While palliative chemotherapy does not conventionally aim for conversion, neoadjuvant therapy in borderline resectable or locally advanced pancreatic cancer seeks tumour downstaging to enable surgical resection. In this

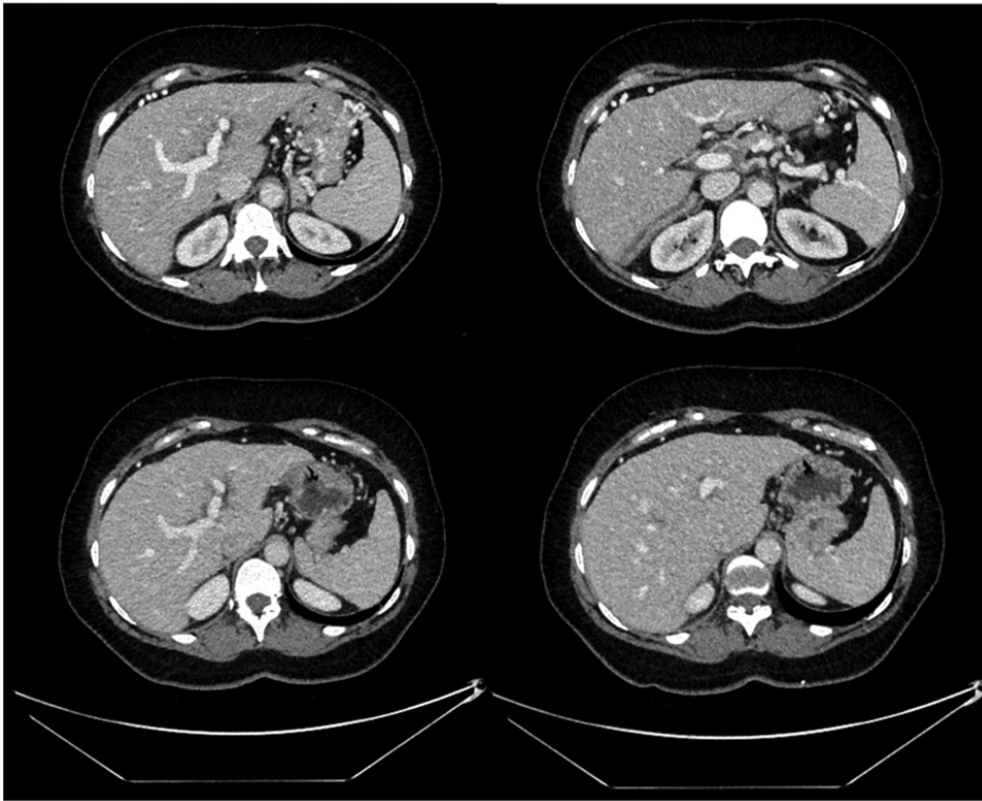


Figure 4. Sustained radiological disappearance of liver metastases during systemic therapy (2019). Top row: Interval contrast-enhanced CT performed in June 2019, with axial images (left) and coronal reconstructions (right), demonstrating no radiologically identifiable liver lesions. Bottom row: Interval contrast-enhanced CT performed in December 2019, with axial images (left) and coronal reconstructions (right), confirming persistent absence of radiologically detectable liver metastases. At this stage, the patient had completed 19 cycles of FOLFIRINOX chemotherapy, with sustained hepatic response.

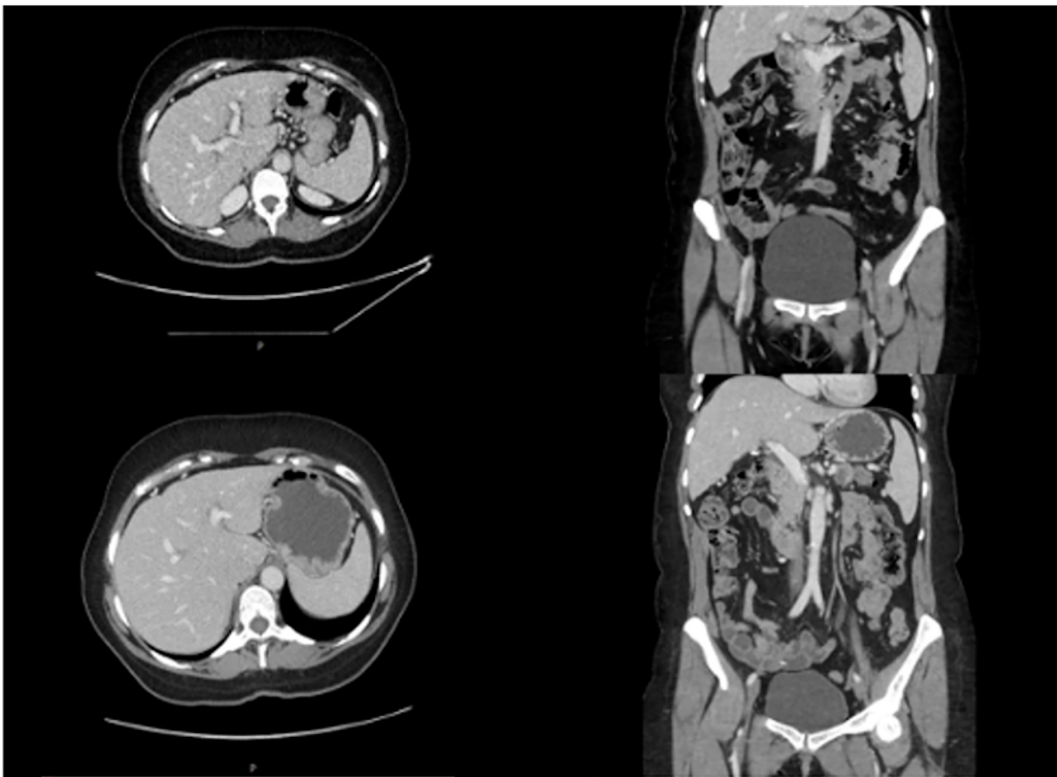


Figure 5. Durability of hepatic response on long-term surveillance imaging (2020). Top row: Contrast-enhanced CT performed in July 2020, with axial images (left) and coronal reconstructions (right), showing continued absence of detectable liver metastases. Bottom row: Interval contrast-enhanced CT performed in October 2020, with axial images (left) and coronal reconstructions (right), demonstrating sustained complete radiological response in the liver with no detectable metastatic disease.

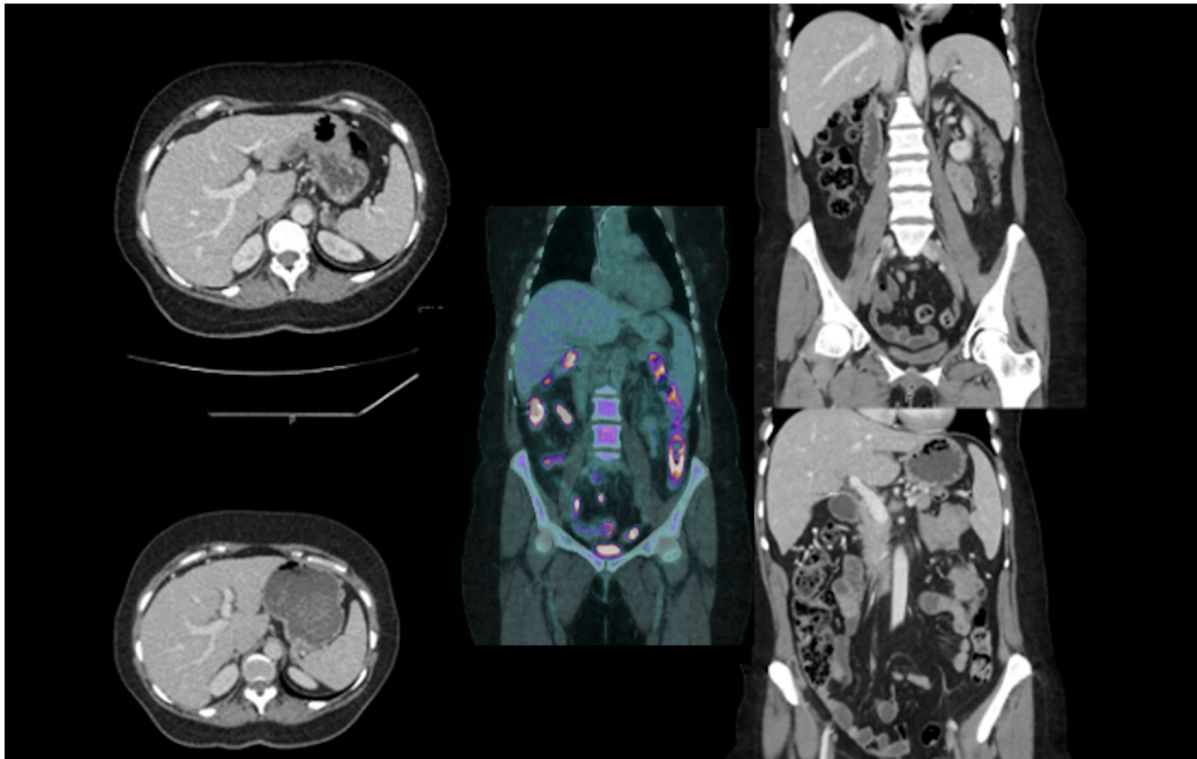


Figure 6. Sustained hepatic response on interval imaging and metabolic assessment (2021). Contrast-enhanced CT images demonstrating continued absence of radiologically detectable hepatic metastases. Left column: Two representative axial CT images obtained at different levels of the liver showing no focal hepatic lesions. Right column: Coronal contrast-enhanced CT reconstructions confirming sustained radiological response without evidence of metastatic disease. Centre panel: Whole-body FDG-PET (June 2021) demonstrating complete metabolic response with no abnormal hepatic FDG uptake.

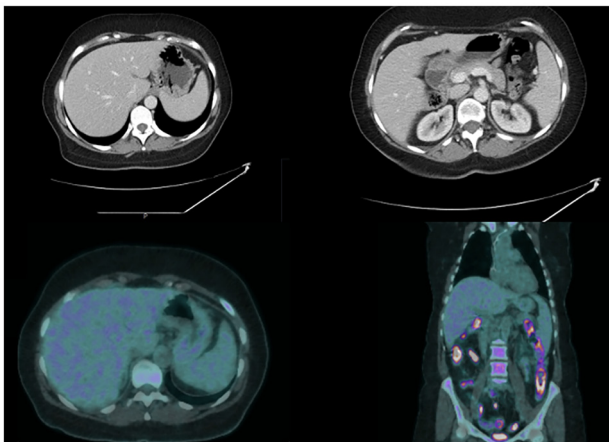


Figure 7. Decision for resection. CT and FDG-PET June 2021 show absence of liver disease, regression of the primary tumour, and complete metabolic response.

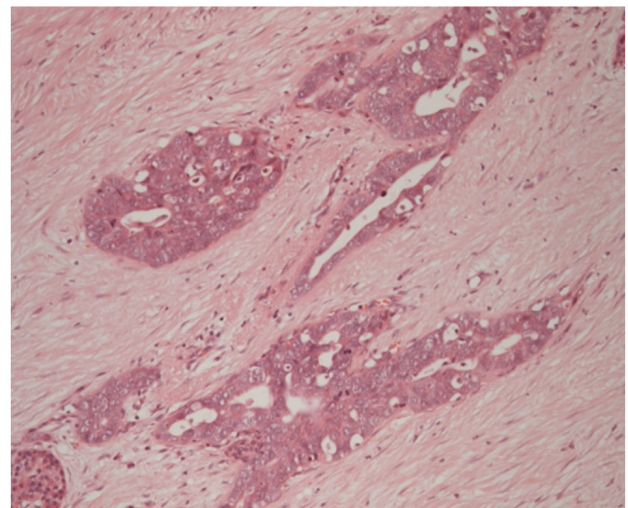


Figure 8. Histopathological findings of the resected pancreatic tumour. Haematoxylin and eosin-stained section demonstrating viable pancreatic ductal adenocarcinoma glands embedded within a desmoplastic stroma, consistent with residual invasive carcinoma following systemic chemotherapy. Staining was performed using standard haematoxylin and eosin protocols. A scale bar is not shown, as magnification metadata were not retained at the time of image acquisition.

context, the role of pathologic complete response (pCR) remains controversial. pCR has been reported in approximately 4.8-10% of resected pancreatic adenocarcinoma cases following neoadjuvant chemotherapy (9-12), though its association with improved disease-free survival is inconsistent (11,12).

In the present case, pCR was not achieved; however, long-term disease-free survival was. This challenges the assumption that pCR is either necessary or predictive of prolonged survival. One report documented mPC with pCR

and an additional six months of survival post-resection, in a patient treated with adjuvant monotherapy using the PARP inhibitor Olaparib (13). Similarly, mPC treated with FOLFIRINOX achieving both pCR and 5-year survival has also been described (8,14). Collectively, these cases suggest that

Table I. Timeline of disease course.

Date	Clinical event
September 2018 Teaching	Diagnosis of poorly differentiated pancreatic adenocarcinoma with liver metastases at Derby Hospitals NHS Foundation Trust.
October 2018	Initiation of palliative FOLFIRINOX chemotherapy.
April 2019	Following 6 cycles, CT demonstrated significant regression of liver metastases.
August 2019	Completion of 19 cycles of FOLFIRINOX. Enrolment in the ACIT-1 vaccine trial and administration of two doses four weeks apart.
September 2019	CT imaging demonstrated sustained response at the primary site; liver metastases no longer visible.
February 2020	Referral to King's College Hospital Hepato-Pancreato-Biliary multidisciplinary team; decision for ongoing surveillance. Patient requested a chemotherapy break.
September 2019-December 2020	Chemotherapy-free interval of 15 months.
November 2020 to	Radiological progression at the primary site; FOLFIRINOX treatment resumed with dose reduction 60% for the final four cycles (total 12 cycles).
June 2021	CT and FDG PET show complete radiological and metabolic response. Reviewed by the Hepato-Pancreato-Biliary multidisciplinary team; resection of the primary tumor offered to patient.
August 2021	Patient underwent left pancreatectomy and splenectomy. Histology confirmed invasive adenocarcinoma with high-grade intraductal papillary mucinous neoplasm (with final staging of ypT2N1PN0 LV1R0).
July 2025	Patient remains free of disease.

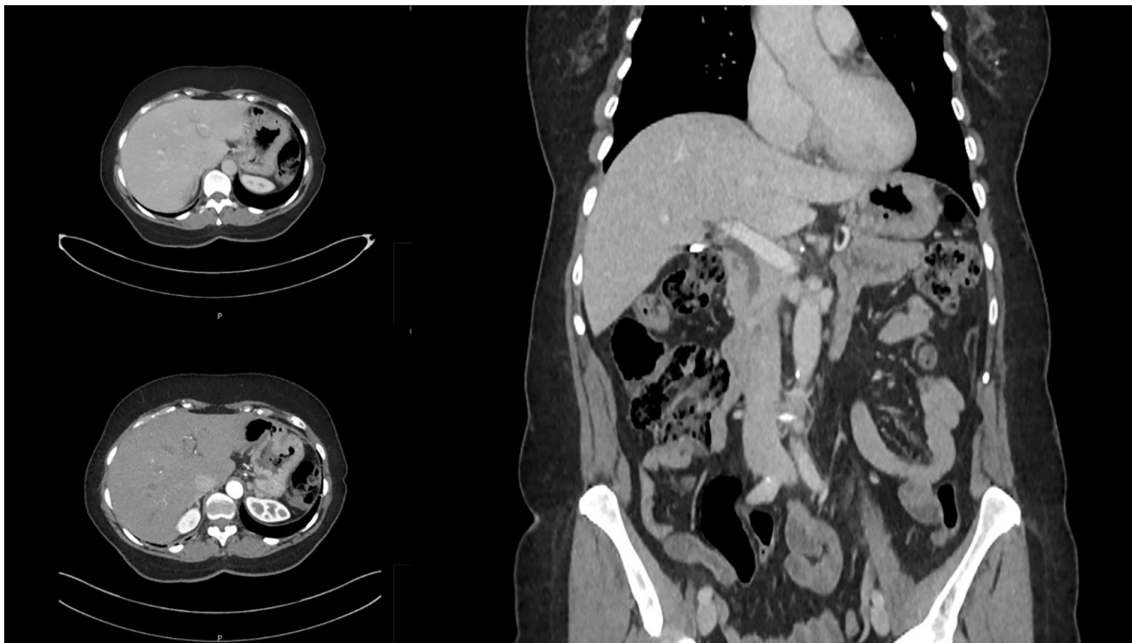


Figure 9. Follow-up contrast-enhanced CT (July 2025) demonstrating no radiologically detectable disease. Left panels: Two representative axial images at different levels of the liver showing no evidence of hepatic metastatic disease. Right panel: Coronal reconstruction confirming absence of recurrent or metastatic disease.

pCR is not essential to survival outcomes and that achieving it should not be viewed as the primary goal.

The interpretation of an apparent complete hepatic response in mPC warrants careful consideration. In the case described here, while serial multiphasic contrast-enhanced CT and FDG-PET imaging demonstrated sustained absence of radiologically and metabolically detectable liver lesions in this case, current imaging modalities have recognised limitations

in reliably excluding residual subcentimeter or microscopic disease, particularly following prolonged systemic chemotherapy. Treatment-related changes may render previously metastatic deposits radiologically occult or metabolically inactive, leading to underestimation of residual tumour burden. FDG-PET, although valuable for functional assessment, lacks sufficient sensitivity to definitively exclude microscopic viable disease, especially in the post-treatment setting.

Intraoperative assessment in this case was limited to systematic macroscopic inspection of the liver, and no intraoperative ultrasound or targeted biopsies were performed, as no suspicious lesions were identified on repeated imaging or at surgical exploration. Consequently, histological confirmation of complete metastatic clearance was not obtained, and the presence of occult residual disease cannot be entirely excluded. This represents an inherent limitation of the present study and reflects broader challenges in defining true complete response in metastatic pancreatic cancer.

In this context, the terms ‘vanishing liver metastases’ and ‘complete radiological regression’ are used descriptively to denote the durable absence of detectable hepatic disease on serial cross-sectional and metabolic imaging, rather than to imply histologically confirmed eradication. The prolonged stability of this response over several years of follow-up, together with favourable clinical outcome, underscores the exceptional nature of this case while acknowledging the limitations of current diagnostic techniques.

The present case represents a particularly remarkable and, to our knowledge, previously undescribed clinical phenomenon within mPC. While rare long-term survivors of mPC have been reported, this case is distinguished by the early and complete radiological disappearance of liver metastases after approximately six months of systemic chemotherapy, followed by sustained absence of detectable hepatic disease on serial cross-sectional and metabolic imaging over a prolonged period. Notably, this durable hepatic response persisted despite treatment interruptions and over several years of follow-up, an observation that challenges conventional expectations of metastatic pancreatic cancer biology. Whether immune-mediated mechanisms, potentially augmented by subsequent vaccine exposure, contributed to the long-term maintenance of this response remains speculative but biologically plausible.

The ACIT-1 trial is an early-phase clinical study investigating the safety and immunogenicity of a novel allogeneic cell-based cancer vaccine (ACIT-1) (15-17). Designed to stimulate host immunity against tumour-associated antigens, the trial included patients with late-stage solid tumours, including pancreatic cancer, using a dose-escalation strategy to balance immunologic response and toxicity (15-17).

While its clinical efficacy remains under investigation, our patient received two doses during a chemotherapy-free interval. Whether ACIT-1 contributed to disease control or to the favourable response observed during subsequent FOLFIRINOX administration is unclear. Importantly, the liver metastases had already shown significant response early in the first course of FOLFIRINOX. Robust conclusions on ACIT-1's role await further data, and, to date, no peer-reviewed clinical outcome results have been published from this trial (NCT03096093) (16).

To our knowledge, this is the first reported case of mPC with initially extensive liver metastases demonstrating complete and sustained regression over the long term. This case is not only remarkable due to the radiological disappearance of liver disease but also because of the durable systemic response, raising the possibility of true cure, an outcome almost unheard of in the context of metastatic pancreatic cancer.

The convergence of favourable tumour biology, multi-modal treatment strategies, and evolving molecular profiling to guide targeted therapies (e.g., immunotherapy, vaccines) may

hold the key to improved outcomes in select cases. A deeper understanding of these components is critical to redefining the therapeutic landscape of this formidable malignancy.

In conclusion, this case illustrates a unique clinical course in which a patient with initially metastatic pancreatic cancer achieved sustained remission and underwent curative-intent resection following systemic chemotherapy. It challenges the long-held belief that metastatic pancreatic cancer is invariably terminal and highlights the importance of individualized, biology-driven treatment pathways. Rare though they may be, such cases underscore the need for continued exploration of predictive biomarkers and tailored therapeutic strategies that may convert inoperable disease into surgical candidates, ultimately improving survival and quality of life.

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Availability of data and materials

The data generated in the present study are included in the figures and/or tables of this article.

Authors' contributions

EF conceived and designed the study, collected and curated the clinical data, performed data analysis and interpretation, and drafted the manuscript. PR contributed to data interpretation and provided critical intellectual input during manuscript revision, particularly with respect to oncological management and systemic therapy. PS contributed to acquisition and interpretation of surgical data and provided critical revision of the manuscript for important intellectual content. AP contributed to study conception, interpretation of surgical and histopathological findings, and critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript and agree to be accountable for all aspects of the work. EF and AP confirm the authenticity of all raw data.

Ethics approval and consent to participate

Not applicable.

Patient consent for publication

Written informed consent was obtained from the patient for publication of this report and accompanying images.

Competing interests

The authors declare that they have no competing interests.

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