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Mucinous Cystic Neoplasm of the Pancreas Treated with Corporocaudal Pancreatectomy. Case Series

Neoplasia Quística Mucinosa del Páncreas Tratada con Pancreatectomía Corporocaudal. Serie de Casos

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MANTEROLA, C.; CLAROS, N. & BECKER. R. Mucinous cystic neoplasm of the pancreas treated with corporocaudal pancreatectomy. Case series. *Int. J. Morphol., 43(4)*:1117-1121, 2025.

SUMMARY: Mucinous cystic neoplasm of the pancreas (MCNP) is an uncommon, oligosymptomatic tumor that is typically diagnosed incidentally and predominantly affects females (90-95 %) between the 5th and 7th decades of life. These neoplasms are characterized by presenting as solitary lesions, without involvement of the main pancreatic duct. Could be associated with malignancy in 10 % to 40 % of cases. The aim of this study was to report the results of patients with MCNP who underwent surgery and to review the existing evidence regarding their morphological, therapeutic and prognostic characteristics. Seven patients (6 female), with a mildly asymptomatic abdominal mass. The diagnosis was confirmed by ultrasound, computed tomography and magnetic resonance imaging. They underwent surgery, performing a corporocaudal pancreatectomy. There were no postoperative complications or mortality. Patients were discharged after 3 days and have progressed well, with no postoperative complications, with a median follow-up of 36 months. MCNP is a lesion that may be associated with malignancy, which cannot be established with certainty in the preoperative stage. The prognosis depends on early diagnosis and timely treatment.

KEY WORDS: Pancreatic Cyst/therapy; Pancreatic Neoplasms/diagnosis; Pancreatic Neoplasms/therapy; Pancreatectomy.

INTRODUCTION

Mucinous cystic neoplasm of the pancreas (MCNP) is a rare tumor that predominantly affects women (90-95 %), typically presenting between the fifth and seventh decades of life. It is usually discovered incidentally during abdominal imaging studies (Fig. 1). These neoplasms are most often solitary lesions without involvement of the main pancreatic duct, exhibit few symptoms, and are associated with malignancy in 10 to 40 % of cases, depending primarily on their size (Burk *et al*., 2018; European Study Group on Cystic Tumours of the Pancreas, 2018; Hasan *et al*., 2019; Hurtado-Pardo *et al*., 2019; van Huijgevoort *et al*., 2019).

From a pathological perspective, MCNP is generally composed of cysts larger than 2 cm, containing septa and mucin inside. It is sometimes multilocular, with up to 6 cysts, but without communication with the pancreatic ductal system. It may present as a single great cystic tumor, with papillary projections and peripheral "eggshell" calcifications, which suggest malignancy. It is an epithelial-type tumor, often composed of columnar mucin-producing epithelium with varying degrees of dysplasia (Jablonska *et al*., 2021). Some clinical guidelines and expert recommendation articles have proposed decision-making algorithms for the treatment of pancreatic mucinous cystic lesions in general, which also cover certain cases of MCNP (Tanaka *et al*., 2017; European Study Group on Cystic Tumours of the Pancreas, 2018; van Huijgevoort *et al*., 2019).

The treatment for MCNP, depending on their size, is typically surgical. However, minor postoperative complications have been reported in up to 23.1 % of cases, even in reference centers. Additionally, there is evidence of major postoperative complications (POC), including peritonitis (13.3 %) and sepsis (12.2 %). The reoperation rate reaches up to 15.8 %, and mortality rates associated with distal pancreatectomy, both with and without splenic preservation, are reported at 7.3 % and 7.7 %, respectively (Nimptsch *et al*., 2016).

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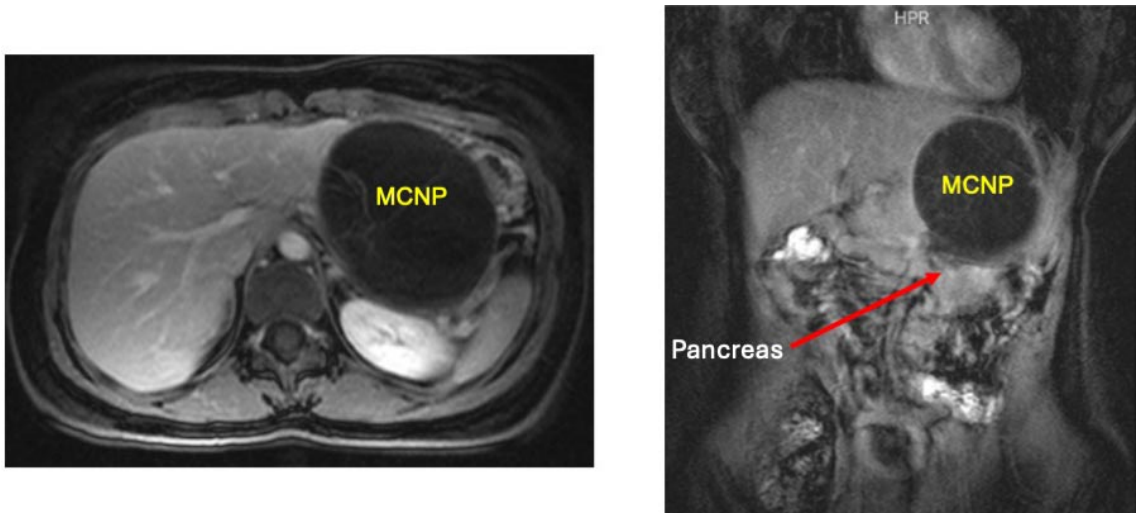

Fig. 1. Abdominal CT: Axial and coronal reconstruction showing a large, hypodense, rounded lesion with smooth contours and a well-defined wall, located in the body and tail of the pancreas. The lesion contains internal septations that show mild enhancement with intravenous contrast, measuring 8.4 x 8.8 x 11 cm in diameter.

The aim of this study was to report the results of patients with MCNP who underwent surgery and to review the existing evidence regarding their morphological, therapeutic and prognostic characteristics.

The report of this study was made according to the checklist for descriptive observational studies MInCir-DOS (Manterola & Otzen, 2017).

MATERIAL AND METHOD

Design: Case series

Setting: The study was carried out at RedSalud Mayor Clinic in Temuco between January 2014 and September 2024 (10 years).

Participants: Subjects with single MCNP. The preoperative study consisted of general examinations, abdominal ultrasound, computed tomography or magnetic resonance.

Sampling: A consecutive, non-probabilistic sampling was used.

Surgical technique: Surgery was performed with the patients under general anesthesia and placed in supine position. After cyst localization, a total cystectomy was performed with LigaSure™ Maryland and laparoscopic Hook, making the resection in healthy pancreatic parenchyma. Suction drainages were used up-to 3 days postoperatively and amylase was measured in peritoneal fluid collected through the drain at 24, 48 and eventually 72 hours after surgery.

Variables: The outcome was POC measured 30 days postoperatively. Other variables of interest were surgical time, hospital stay, and mortality.

Follow-up: All of the resected specimens were subjected to histopathological study. Patients have been followed and controlled at months 1, 6, 12 and 24 with abdominal ultrasound or computed tomography and general exams.

Statistics: Descriptive statistics were used with calculation of percentages, measures of central tendency and dispersion.

Ethical principles: The identity of the patients was reserved using codes.

RESULTS

In the period studied, 7 patients with MCNP (median age of 56 years, 85.7 % female), underwent surgery.

The median ultrasound or tomographic diameter of the lesions was 7 cm (6 to 10 cm).

The behavior of the laboratory variables can be observed in Table I, but discrete elevation in its medians and maximum values was registered in the variables erythrocyte sedimentation rate, serum amylase and lipase, alkaline phosphatases and carcinoembryonic antigen determination (Table I). The 57.1 % of the patients had some coexisting diseases, and 71.4 % had anechoic ultrasonographic pattern. (Table II) Corporocaudal pancreatectomy was performed in 4 cases and caudal pancreatectomy in 3 (Fig. 2). In all cases a suction drainage was used. In 28.6 % (2 patients), a splenectomy was added to the pancreatectomy. In 42.9 % of cases (3 patients), a cholecystectomy for cholelithiasis was performed simultaneously.

Table I. Laboratory variables of the in study patients (N=7).

Variables	Median	Minimum	Maximum	*Normal values*
Hemoglobin (g/dL)	13,8	13	17	13.5 – 17.0
Hematocrit (%)	38	35	40	40 - 54
Total leukocytes (10^3/ul)	8500	6500	9500	4000 - 10000
Platelets (10^3/ul)	240	190	360	150 - 400
ESR (mm/h)	22	13	34	0 - 13
Glycemia (mg/dL)	95	80	99	70 - 100
Creatinine (mg/dL)	0.8	0,7	1.1	0.6 - 1.2
Amylase (U/L)	560	190	4483	12 - 70
Lipase (U/L)	370	320	650	0 - 137
Total proteins (g/dL)	7.6	7.0	8.1	6.4 - 8.3
Albumin (g/dL)	4.1	3.8	4.5	3.4 - 4.8
Total bilirubin (mg/dL)	0.8	0.7	1.0	0.2 - 1.3
Alkaline phosphatases (U/L)	200	180	225	38 - 126
ASAT (U/L)	23	19	32	17 - 59
ALAT (U/L)	28	13	35	21 - 72
GGTP (U/L)	60	30	70	15 - 73
Prothrombin (%)	95	81	100	70 - 100
PTT (s)	28	25	32	21 - 32
CEA (ng/mL)	12	2.5	18	< 2.5
Ca 125 (U/mL)	8	2	15	< 35
Ca 19-9 (U/mL)	18	15	22	< 40

ESR: Erythrocyte sedimentation rate; ASAT: Aspartate aminotransferase; ALAT: Alanine aminotransferase; GGTP: Gamma glutamyl transferase; PTT: Partial thromboplastin time; CEA: Carcinoembryonic antigen.

The median surgical time was 90 minutes, and the median hospital stay was 3 days. POC occurred in 28.6 % (2 patients: acute bronchitis and surgical wound infection, one each). No reintervention was required in any patient. No mortality was recorded. The histopathological study confirmed MCNP in all cases. In one case, high-grade dysplasia, carcinoma in situ and microfoci of conventional invasion was found; in 3 cases, low-grade dysplasia was verified; in the remaining 3 cases, no foci of dysplasia were observed in the surgical specimen (Fig. 3). On the other hand, chronic pancreatitis was found in two cases, and non-specific chronic lymphadenitis in the resected lymph nodes along with the surgical specimen. With a median follow-up of 36 months (6 to 72 months), there has been no evidence of late morbidity or recurrence of the resected lesions. In addition to surgery, the patient with carcinoma in situ and microfoci of conventional invasion was treated with 6 cycles of adjuvant chemotherapy.

Table II. Clinical characteristics. (N = 7)

Variable	Nº cases	Frequency
Coexisting diseases *		
AHT	2	28.6
Cholelithiasis	1	14.3
DM2 + AHT	1	14.3
None	3	42.9
Ultrasonographic pattern		
Anechoic	5	71.4
With internal echoes	2	28.6

* : Some patients had more than one pathology. AHT: arterial hypertension; DM2: Type 2 diabetes mellitus.

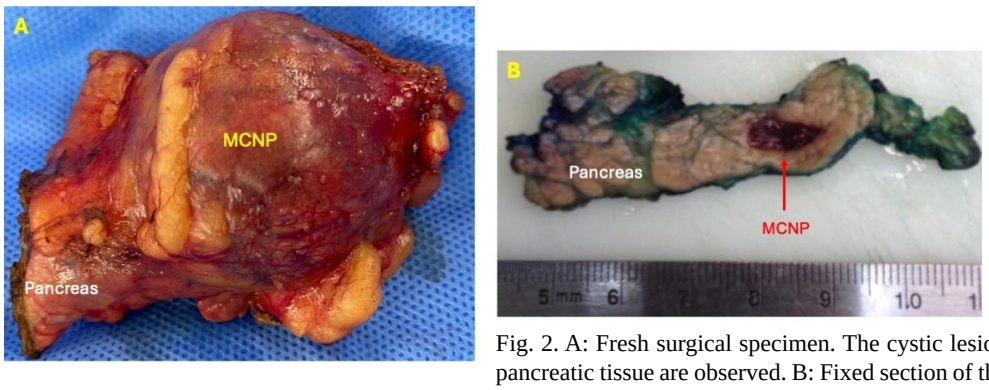

Fig. 2. A: Fresh surgical specimen. The cystic lesion and the margin of tumor-free pancreatic tissue are observed. B: Fixed section of the surgicalspecimen. The tumor-free pancreatic parenchyma and the MCNP are visible.

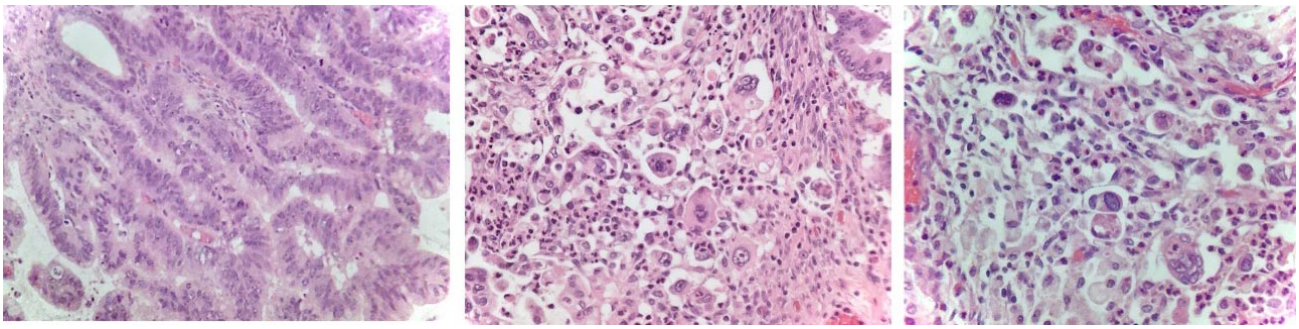

Fig. 3. Microscopy of one of the surgical specimens reveals the in situ and microinvasive components of a MCNP with high-grade dysplasia/carcinoma in situ and microfoci of conventional invasion.

DISCUSSION

MCNPs are mucin-producing epithelial cell tumors, which may consist of an ovarian-type stroma expressing estrogen and progesterone receptors. Evidence suggests that pregnancy can lead to a rapid increase in the size of MCNPs, a factor that adds complexity to decision-making (Dhamor *et al*., 2023). The analysis of cyst fluid from an MCPN may reveal elevated levels of CEA, positive mucin staining, normal amylase levels, and low glucose levels (Menon *et al*., 2023).

NQMP warrants surgical intervention primarily due to its potential risk of malignancy, which can reach up to 40 % of cases. The variables to consider for surgery include a diameter > 4 cm or the presence of a mural nodule. Additionally, the lesion's location and the patient's baseline conditions must also be considered (Tanaka *et al*., 2017; European Study Group on Cystic Tumours of the Pancreas, 2018; Keegan & Paranandi, 2019; Pollini *et al*., 2023). Nevertheless, a systematic review confirmed that patients with pancreatic MCPN have an overall rate of extra pancreatic malignancies of up to 27.3 %. However, the rate of metachronous extrapancreatic malignancies (such as gastric and colon cancer) is not higher than that of the general population (Facciorusso *et al*., 2022).

The recommended surgical procedure for patients with NQMP is distal pancreatectomy (90-95 %, as it prevents incomplete treatment of a potential invasive carcinoma), combined with lymph node dissection and splenectomy if there is evidence of high-grade dysplasia, lymph node involvement on CT, or tumor involvement of splenic or peripancreatic vessels (Elabbasy *et al*., 2015; Li *et al*., 2019; Moekotte *et al*., 2020; Ni *et al*., 2023; Timmerhuis *et al*., 2023). On the other hand, in patients considered to have a low risk of malignancy or with lesions lacking suspicious characteristics, a distal pancreatectomy with splenic preservation, with or without preservation of splenic vessels, may be indicated. Laparoscopic access is feasible, but its benefit compared to open access is comparable (European Study Group on Cystic Tumours of the Pancreas, 2018). Alternatively, enucleations and central pancreatectomies are recommended strategies exclusively for benign or borderline lesions, provided that a contemporaneous biopsy confirms the absence of malignant features (Hackert *et al*., 2017). Although the treatment of NQMP typically involves surgery, CPO related to pancreatic resection may occur in up to 23.1 % of cases. Furthermore, evidence indicates a reoperation rate of up to 15.8 %, as well as a mortality rate associated with distal pancreatic resection—with or without splenic preservation—of 7.3 % and 7.7 %, respectively (Manterola *et al*., 2020).

The surveillance strategy following pancreatectomy for NQMP remains undefined, and existing guidelines provide conflicting recommendations. The definition of residual pancreatic lesion in this context is heterogeneous (Correa-Gallego *et al*., 2023).

As limitations, it should be noted that this study involves only six cases and that the existing evidence regarding this type of lesion is insufficient to allow for meaningful comparisons of outcomes.

Among the lessons learned, the importance of rigorous and periodic imaging follow-up stands out, as it helps prevent excessive growth of these lesions, which can complicate complete surgical resection, increase the risk of postoperative morbidity and mortality, and reduce survival expectations.

Drawing a definitive conclusion is challenging, particularly given the small number of cases reported of an uncommon condition.

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RESUMEN: La neoplasia quística mucinosa del páncreas (NQMP) es un tumor inhabitual, oligosintomático, cuyo diagnóstico suele ser incidental, y que afecta predominantemente al sexo femenino (90-95 %), entre la 5ª y 7ª década de la vida. Se caracterizan por presentarse como lesiones únicas, sin compromiso del conducto pancreático principal; pero asociadas a malignidad entre un 10 % y 40 % de los casos. El objetivo de este estudio fue reportar los resultados de pacientes con NQMP intervenidas quirúrgicamente y revisar la evidencia existente respecto de sus características morfológicas, terapéuticas y pronósticas. Siete pacientes (6 de sexo femenino) con masa abdominal poco sintomática. El diagnóstico se verificó por medio de ultrasonografía, tomografía computarizada o resonancia magnética. Se intervinieron quirúrgicamente, realizándose pancreatectomía corporocaudal. No se registraron complicaciones postoperatorias ni mortalidad. Las pacientes fueron dadas de alta a los 3 días, y han evolucionado de forma adecuada, sin complicaciones postoperatorias con una mediana de seguimiento de 36 meses. La NQMP es una lesión que puede asociarse a malignidad, lo que no puede establecerse con seguridad en el preoperatorio. El pronóstico depende de un diagnóstico precoz y un tratamiento oportuno.

PALABRAS CLAVE: Quiste pancreático; Neoplasia pancreática; Pancreatectomía.

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