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КЛИНИЧЕСКИЙ СЛУЧАЙ

## Urgent total pancreatoduodenectomy for profuse gastro-intestinal bleeding caused by renal cancer metastases to the pancreas

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**Abstract.** Renal cancer (RC) can spread to different organs, metastatic damage of the pancreas is quite rare. But, in contrast of primary and other metastatic malignant tumors, pancreatic RC metastases can be resectable in 80 % of cases with nearly 90 % 5-year survival rate. Pancreatic oncologic surgery includes 3 different types of resection: distal pancreatic resection, pancreatoduodenal resection and total duodenopancreatectomy. The last type is the most extensive procedure, incorporates except of total removal of the pancreatic gland, total excision of duodenum and, in some cases, partial gastrectomy. In surgery of pancreatic tumors using of total duodenopancreatectomy is relatively rare (6,7–12,3 %). And in spite of low mortality (5–6,25 %) in recent years, whole removal of the gland inevitably leads to severe metabolic changes such as complete exocrine insufficiency and unstable insulin-dependent diabetes mellitus which need lifetime medical correction. Gastrointestinal bleeding from pancreatic metastases of RC as a disease complication occurs quite rare and appears due to invasion of cancer tissue located in the pancreatic head to duodenal mucosa and then ulcerated. There are few single observations or little series (2–4 cases) described in literature. Pancreatoduodenal resection in such cases is the main type of surgical intervention. Now we present a case of successful urgent total duodenopancreatectomy, performed for recurrent profuse gastrointestinal bleeding from pancreatic head metastasis of RC invaded duodenum after previously radical nephrectomy. During the operation several cancer nodes in the pancreatic body and tail were found that defined the total gland removal. Postoperative period proceeded uneventfully and the patient was discharged on 15<sup>th</sup> day. Uniqueness of this case is that emergency total duodenopancreatectomy was successfully done for profuse gastrointestinal bleeding as the only possible chance for cure. We have not found similar reports in the available literature.

**Key words:** renal cancer, metastases to the pancreas, total duodenopancreatectomy, gastrointestinal bleeding

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**Consent for publication.** The patient provided voluntary informed consent to participate in the study in accordance with the Declaration of Helsinki of the World Medical Association (WMA Declaration of Helsinki — Ethical Principles for Medical Research Involving Human Subjects, 2013) and the processing of personal data.

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## Introduction

Renal parenchyma cancer is the 14th most common cancer in the world among malignant tumors. Clear cell carcinoma is the most common histological type of RC [1], which metastasizes both hematogenically and lymphogenically. Most often metastases are found in the lungs (50–60 %), bones and liver (30–40 % each). Next in frequency are the adrenal glands, the contralateral kidney, and the brain. RC metastases to the pancreas are mentioned much less frequently in the literature, in 1.6–11 % of cases [2]. On the other hand, metastases account for only 2–5 % of all tumors found in the pancreas. RC metastases represent most of them (about 70 %) and can be detected many years after the removal of the primary tumor [3–5]. In addition, metastases of lung cancer, colon cancer, breast cancer, melanoma can be detected in the pancreas. But if in these diseases the involvement of the pancreas, as a rule, is one of the manifestations of extensive tumor dissemination, excluding the possibility of surgical intervention, then in case of RC it is often isolated or combined with single metastases in other organs [6].

Pancreatic metastasis of RC is multifocal in about 39 % of patients and resectable in 80 %, which is significantly higher than in primary pancreatic adenocar-

cinomas. In these cases, resection of the pancreas with its isolated lesion provides a good long-term result. More than 250 cases of pancreatic resections for metastatic renal cell carcinoma have been described in the literature. The five-year survival rate in this group of patients ranges from 43 to 90 % [7].

In the surgical treatment of malignant tumors of the pancreas, depending on their localization and prevalence, 3 types of operations are used: distal resection, pancreatoduodenal resection and, less often, total duodenopancreatectomy (TDPE), while the last 2 interventions can be performed both with preservation of the stomach and with its resection. At the same time, TDPE is the most extensive and traumatic procedure, and in all cases leads to profound metabolic consequences in the form of extremely labile current diabetes mellitus and complete pancreatic exocrine insufficiency, which require lifelong drug correction.

The first successful TDPE for hyperinsulinism was performed by J. Priestley in 1944 at the Mayo Clinic, and he also reported about the patient, including his metabolic status, 5.5 years later [10]. Gaston E.A. in 1948 described 17 TDPE performed by different authors for cancer, neuroendocrine tumors of the pancreas and chronic pancreatitis with a postoperative mortality of 59 % [11].

In the USSR and Russia, the A.V. Vishnevsky Institute of Surgery has the greatest experience in performing TDPE, where the first such operation was performed by V.A. Vishnevsky with the participation and under the guidance of acad. RAMS M.I. Kuzina in 1979 [12]. In the Rostov Oncologic Institute during 18 years (1987–2005), 23 TDPE was performed for pancreatic tumors and locally advanced stomach cancer with a mortality rate of 30 % [13].

The proportion of TDPE in the leading world pancreatological centers currently ranges from 6.7 to 16.9 % among all pancreatic resection. Postoperative mortality dramatically decreased and currently amounts to 5–6.25 % [14, 15].

RC metastases are very rarely manifested by gastrointestinal bleeding (GIB), single reports are described in the literature [16]. In this article, we present a case of successful surgical treatment of recurrent profuse GIB, due to metastasis of renal cell carcinoma in the pancreatic head, invading duodenum after a previously nephrectomy. The uniqueness of the observation is that the patient underwent emergency TDPE as the only possible way of treatment. We have not found such cases in the available literature.

## Materials and methods

Previously, the patient received voluntary informed consent to participate in the study in accordance with the Helsinki Declaration of the World Medical Association (WMA Declaration of Helsinki — Ethical Principles for Medical Research Involving Human Subjects, 2013) and the processing of personal data. The study was approved by the Commission of the Ethics Committee State Budgetary Healthcare Institution “City Clinical Hospital named after I.I. V.V. Vinogradov of the Department of Health of Moscow, Moscow, Russia.

Patient M., female, 71 years old, was admitted on 27.10.2021 as planned to the Department of Clinical Dietetics of the V.V. Vinogradov State Clinical Hospital with a clinical picture of anemia (Hb – 85 g/l) without obvious signs of GIB. In 2009, she underwent nephrectomy for a clear cell cancer of the right kidney. In 2017, control CT revealed multiple metastases in the

pancreas. At the same time, a decrease in hemoglobin to 80 g/l was detected without clinical manifestations of GIB. An operation was proposed — resection of the pancreas, but the patient refused. In December 2019 PET-CT revealed the presence of pathological neoplastic tissue with hypermetabolism of the radiopharmaceutical in the pancreatic head with the germination of the tumor node into the lumen of the duodenum, multiple similar formations in the body and tail of the pancreas, single neoplasms in the lungs. At the same time, during esophagogastroduodenoscopy (EGDS), ulceration of the duodenum was first detected as a consequence of the invasion of the intestinal wall by a metastatic node located in the head of the pancreas. In January 2020, a percutaneous biopsy of one of the foci in the tail of the pancreas was performed, the sample of light cell kidney cancer was found. In 2020, she received 4 courses of chemotherapy, and is currently in the process of immunotherapy. In 2020–21, she noted repeated episodes of GIB, manifested by melena. She was treated inpatient in commercial clinics, multiple hemotransfusions, embolization of the arteries supplying the head of the pancreas were performed, but episodes of bleeding repeated. This hospitalization is associated with anemia.

On the second day of hospitalization, the patient complained of vomiting by blood. With emergency EGDS, an intensive jet flow of scarlet blood was detected from a tumor formation located on the medial and posterior walls of the vertical part of the duodenum, attempts at endoscopic hemostasis proved ineffective. In an emergency, the patient was taken to the operating room for vital indications. Median laparotomy was performed. During the revision of the abdominal organs, it was found that the small and initial parts of the colon were filled with fresh blood. There are no signs of tumor lesions of the parietal and visceral peritoneum. Almost the entire head of the pancreas is represented by a dense elastic tumor formation with a diameter of 4 cm with a smooth surface. The formation is mobile, does not invade surrounding tissues and main vessels, and intimately connected with the medial wall of the descending part of the duodenum. In the body and tail of the gland, several similar tumor nodes with a diameter of 1.5–2 cm are determined. No metastases were found in other abdominal organs. Based

on the endoscopy data, duodenotomy was performed. Just above the region of the Vater on the medial wall, tumor tissues were detected, from which active arterial bleeding continues. The bleeding areas are stitched by 8-shaped manner, but the intensity of bleeding does not decrease. Temporary hemostasis was achieved by pressing, the gastroduodenal artery was isolated, bandaged and crossed — without effect. An intraoperative consultation has been assembled: taking into account the ongoing bleeding, the inability to perform hemostasis by low-traumatic methods, the resectability of the tumor, according to vital indications, gastropancreatoduodenal resection is indicated. In order to reduce the intensity of bleeding first, the neck of the pancreas was divided, then uncinated process of the gland gradually dissected with ligation of the vessels passing through it. The intensity of bleeding was decreased significantly. Further mobilization proceeded typically, the gastropancreatoduodenal complex was removed in a standard volume. Cholecystectomy was performed. On the cut edge of the pancreatic stump, the main pancreatic duct was not determined. Taking into account the presence of tumor nodes in the distal stump of the pancreas, the absence of the main pancreatic duct dilation and, in this regard, an extremely high risk of pancreatodigestive anastomosis insufficiency, as well as the relatively stable condition of the patient, it was decided to perform extirpation of the body and tail of the pancreas with the preservation of the spleen. The distal parts of the gland are mobilized from the splenic vessels, and the surrounding tissues are removed. A terminolateral hepaticojejunostomy with a diameter of 6 mm with a single-row nodular suture with a monofilament thread with a diameter of 4/0 was formed with the initial part of the jejunum. Distal of 30 cm, a 4 cm wide lateral gastrojejunostomy was applied with a 2-row continuous suture. Examination of the spleen — viable, normal size. The wound was sutured in layers. The duration of the operation was 4 hours, the total blood loss was 1500 ml. During the operation, hemodynamics was maintained by the administration of norepinephrine at a dose of 0.55 to 0.85 micrograms/kg/min., 590 ml of erythrocyte suspension and 770 ml of fresh frozen plasma were transfused on the operating table. The patient was transferred to the intensive care unit with lung ventilation, with a blood pressure of 130/70 mmHg against the

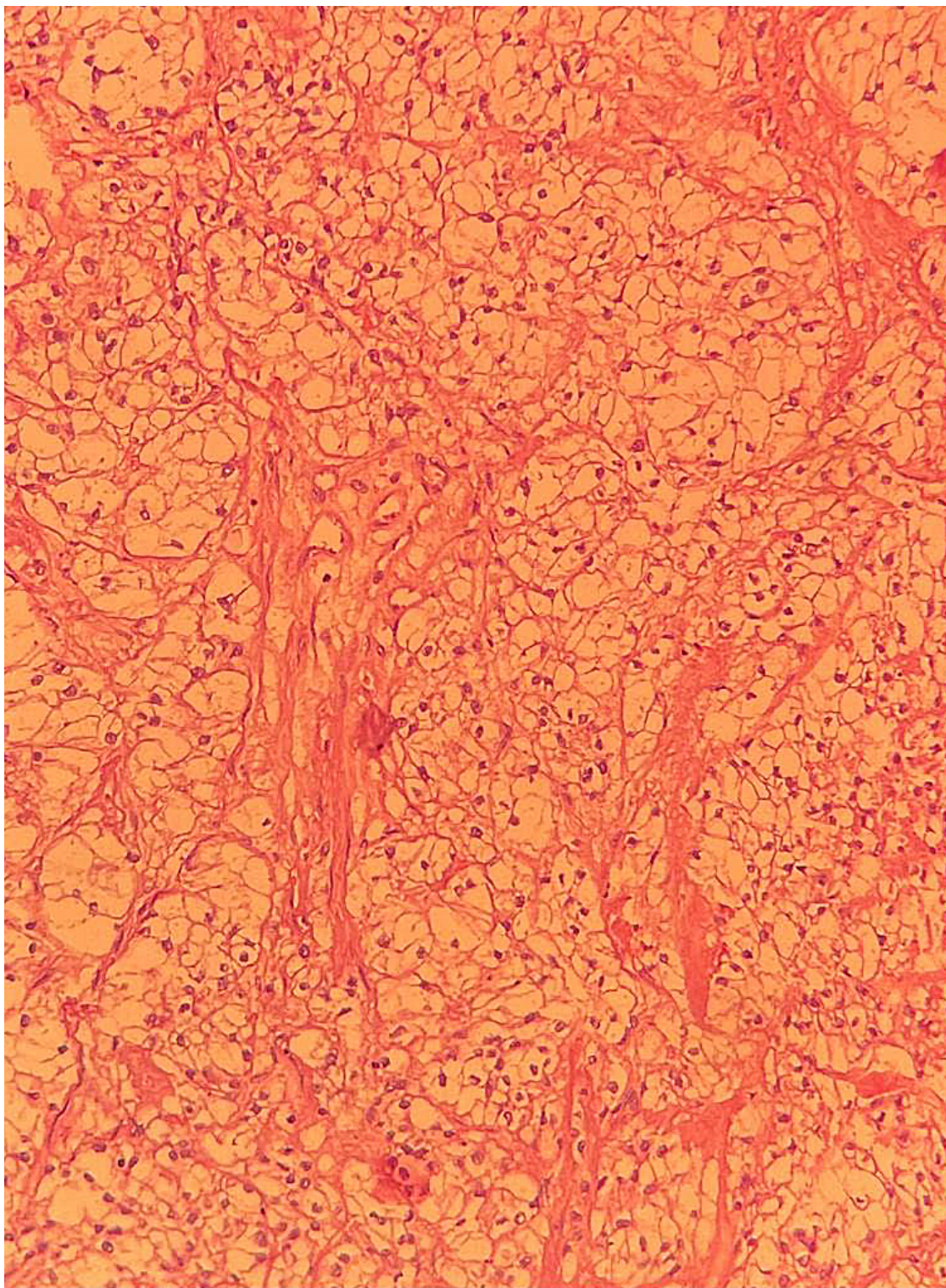
background of constant infusion of norepinephrine at a rate of 0.45 mcg/kg/min.

## Results and discussion

In the postoperative period, the patient was in the intensive care unit for 7 days. Intensive therapy was carried out according to the standard scheme with respiratory and vasopressor support, infusion-corrective therapy, prolonged antibiotic prophylaxis, nutritional support, correction of glycemia, prevention of thromboembolic complications, anesthesia. Vasopressor support and artificial lung ventilation were de-escalated and completely stopped for 3 days. From the first hours after surgery, the patient received insulin in the form of a constant infusion at a dose of 1 to 4 units per hour, depending on the level of glycemia, which ranged from 19.1 mmol/l to 4.7 mmol/l. Nutritional support was provided by parenteral administration of a balanced solution of amino acids, fats and carbohydrates from the 2-nd postoperative day, with a gradual transition to mixed, and then (on the 5th day) complete enteral nutrition using special mixtures for adults. At the same time, the patient began to receive enzyme replacement therapy with the drug “Creon” at a dose of 80–120 thousand units per day, depending on the nutritional load. The patient was examined daily by an endocrinologist in order to correct the dose and mode of insulin administration. After switching to oral nutrition, long-acting insulin (Levemir) was prescribed 4 units in the morning and 4 units at 21.00 and short-acting insulin based on the level of glycemia (monitoring every 4 hours) and the volume and quality of nutrition.

Postoperative period was uneventful. Drains were removed on the 5th–6th day after surgery. The postoperative wound was healed. The patient was discharged for outpatient follow-up treatment on the 15-th day after the operation. Glycemia varied from 3,1 to 12,5 mmol/l, stool was 2–3 times per day.

Histological examination revealed metastases of light renal cell carcinoma in the pancreatic head, spreading into the duodenal wall to the mucous layer, with ulceration. Metastases also were found in 4 peripancreatic lymph nodes, as well as in the body and tail of the pancreas (Fig. 1)



**Fig.1.** Cells of clear cell squamous cell carcinoma of the right kidney. Stained with hematoxylin and eosin x100

## Conclusion


This observation demonstrates, on the one hand, the duration of the course of light cell kidney cancer after radical surgical resection. On the other hand, we are faced with an extremely rare cause of recurrent gastrointestinal bleeding — the invasion of RC metastasis in the head of the pancreas into the duodenum. Despite the wide spread pancreatic lesion, profuse bleeding, which required an emergency surgical intervention, an extremely large volume of emergency operation in the form of a total duodenopancreatectomy, the postoperative period proceeded without complications, because of collaboration of highly professional crew of surgeons, anesthesiologists, resuscitators and an endocrinologist.

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## Экстренная тотальная дуоденопанкреатэктомия по поводу профузного желудочно-кишечного кровотечения, вызванного метастазами рака почки в поджелудочную железу

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**Аннотация.** Рак почки (РП) может метастазировать в различные органы, но метастазы в поджелудочную железу (ПЖ) довольно редки. При этом, в отличие от первичных злокачественных опухолей и метастазов опухолей других локализаций, метастазы в ПЖ рака почки являются резектабельными у 80 % пациентов с 5-летней выживаемостью, достигающей 90 %. Различают 3 типа радикальных операций при опухолях ПЖ, дистальную резекцию, панкреатодуоденальную резекцию и тотальную дуоденопанкреатэктомию (ТДПЭ). Последняя является наиболее объемным вмешательством, подразумевающим помимо полного удаления ПЖ, полное удаление двенадцатиперстной кишки и в ряде случаев резекцию части желудка. В хирургии злокачественных новообразований ПЖ ТДПЭ применяют достаточно редко, от 6,7 до 12,3 % среди всех резекционных вмешательств. И хотя после таких операций летальность в последние годы снизилась до 5–6,25 %, полное удаление ПЖ во всех случаях неминуемо приводит к тяжелым изменениям гомеостаза в виде полной экскреторной недостаточности железы и лабильно текущему инсулинзависимому сахарному диабету, которые требуют пожизненной медикаментозной коррекции. Желудочно-кишечное кровотечение (ЖКК) является редким осложнением поражения ПЖ метастазом рака почки и возникает вследствие прорастания опухолевым узлом, располагающимся в головке железы слизистой оболочки двенадцатиперстной кишки и изъязвления опухолевой ткани. В литературе имеются описания единичных наблюдений и даже небольших (2–4 случая) серий лечения подобных пациентов. Основным типом оперативного вмешательства в данных случаях служит панкреатодуоденальная резекция. В настоящем сообщении мы описываем случай успешной неотложной тотальной дуоденопанкреатэктомии, произведенной по поводу рецидивирующего профузного ЖКК, источником которого послужил метастаз РП в головку ПЖ, прорастающий двенадцатиперстную кишку (ДПК) после ранее выполненной нефрэктомии. На операции, помимо опухоли, вызвавшей кровотечение, были обнаружены множественные метастатические узлы в теле и хвосте ПЖ, что и определило объем вмешательства. Послеоперационный период протекал без осложнений, пациентка была выписана на 15 сутки после операции. Уникальность наблюдения состоит в том, что пациентке успешно выполнена экстренная ТДПЭ по поводу профузного желудочно-кишечного кровотечения как единственно возможный вариант хирургического лечения. В доступной литературе мы не обнаружили аналогичных сообщений.

**Ключевые слова:** рак почки, метастазы в поджелудочную железу, тотальная дуоденопанкреатэктомия, желудочно-кишечное кровотечение.

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