CASE REPORT

Acute onset and rapid progression of multiple organ failure in a young adult with undiagnosed disseminated colonic adenocarcinoma

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SUMMARY

Colourectal cancer (CRC) is the fourth most common cause of death from cancer worldwide. While rates for CRC in adults age 50 and older have been declining, incidence rates in young adults, a population routinely not screened, has been increasing. We report a rare case of high-grade CRC in a previously healthy 27-year-old man, presented to us with symptoms of increasing abdominal pain and distension. Extensive diagnostic investigation revealed hepatomegaly with multiple processes, signs of vasculitis, extensive liver necrosis, enlarged retroperitoneal and mesenteric lymph nodes, splenomegaly, ascites and multiple vein thrombosis. The patient passed away shortly after admission due to treatment-resistant tumour lysis syndrome and multiple organ failure. Biopsy results revealed disseminated adenocarcinoma of the colon, with metastases to lymph nodes, liver, lungs and pleura. CRC in younger patients tend to present at a later stage and appears to be more aggressive, with a poorer pathological differentiation.

BACKGROUND

Colourectal cancer (CRC) is the fourth most common cause of death from cancer worldwide. It is the third most common cancer in men and the second in women, with almost 60% of the cases occurring in developed countries.[1] CRC is generally thought of as a disease of the elderly, as its incidence is strongly related to age.[1 2] While rates for CRC in adults age 50 and older have been declining worldwide, largely attributed to implementation of national screening programmes, the incidence in adults younger than 50 years, a population routinely not screened, have been increasing.[3–5] In fact, in the USA, approximately 10% of CRC cases are diagnosed in individuals under age 50.[6] Younger patients, less than 40 years of age, tend to present at a more advanced stage, but have similar stage-related survival time compared with over-all population.[3 4 7 8]

We report a case of rapid disease progression and fatal outcome in a 27-year-old man with high-grade CRC.

CASE PRESENTATION

A previously healthy, 27-year-old Caucasian man, was admitted to department of infectious diseases with a 1-week history of increasing, diffuse abdominal pain and distension, loss of appetite, hyperhidrosis, fatigue, lower extremity swelling and dyspnoea at rest. Additionally, he had lost 5 kg over the past few months, and reported about having suffered right-sided chest pain for several weeks.

His medical and family histories were unremarkable. He worked as a gardener and had no history of sexual risk behaviour, drug abuse, smoking or recent foreign travels.

INVESTIGATIONS AND TREATMENT

Clinical examination revealed hypoxia, hyperthermia, distended and tender abdomen with signs of ascites and organomegaly, dullness on percussion of the right lung and oedema of the lower extremities. The laboratory tests revealed elevated white cell count, liver enzymes and D-dimer. Chest and abdominal CT visualised a right-sided pleural effusion, hepatomegaly with multiple processes, enlarged retroperitoneal and mesenteric lymph nodes, splenomegaly, ascites and thrombosis of the inferior caval, iliac and femoral veins. Based on these initial findings, the patient was suspected of having cancer of unknown primary origin and extensive diagnostic multidisciplinary investigations were initiated to locate the primary cancer site.

He was treated with broad-spectrum antibiotics, and the severe dyspnoea, caused by increasing intra-abdominal pressure, was relieved with ascitic drainage. Ascitic cytology showed high level of reactive mesothelial cells and no presence of malignant cells. The initial pathogen screening, including Epstein-Barr virus, cytomegalovirus, hepatitis B and C viruses, HIV, and measurements of tumour markers, α -fetoprotein, Ca-125 and human chorionic gonadotropin-β were normal.

The patient's condition deteriorated over the next few days, including progressive azotaemia, hyperkalaemia, hypernatraemia, oliguria and hypotension, and he was referred to the intensive care unit (ICU). Despite extensive life support including invasive mechanical ventilation and continuous vasopressor and renal replacement therapy, the patient progressed to severe multiple organ failure, including circulatory, renal, liver and respiratory failure, presumably due to acute tumour lysis syndrome. Rasburicase was given in an attempt to prevent further decline of renal function, explained by increasing cell lysis. Hypocoagulability and severe bleeding from mucous membranes and serosal surfaces was treated with multiple injections of fibrinogen, human prothrombin complex concentrate, supplemented by antithrombin and blood component transfusions, all guided by thromboelastography. Bone marrow and transjugular liver

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biopsies revealed no malignant cells. Measurement of antibodies and components of complement system did not indicate the presence of rheumatic or connective tissue disease. Renewed abdominal CT revealed extensive liver necrosis, portal vein thrombosis and pathological changes in the coeliac trunk and the superior mesenteric artery, consistent with vasculitis. Gradually, abdominal compartment syndrome developed, and surgical decompression was performed. Exploratory laparotomy revealed substantial liver necrosis and the biopsy confirmed extensive vasculitis.

The sudden symptom presentation, rapid disease progression and development of multiple organ failure, accompanied by non-specific diagnostic findings, resulted in the consideration of several differential diagnoses, with high-grade lymphoma being the most likely explanation for patient's condition. Thus, the patient was treated with a course of modified CHOP (cyclophosphamide, doxorubicin, vincristine, prednisolone) treatment, excluding vincristine, but the therapy was stopped due to rapidly declining hepatic function.

OUTCOME AND FOLLOW-UP

On the 11th day of hospital admission, the patient's condition was considered incurable due to progressive organ failure, rhabdomyolysis, coagulopathy, electrolyte derangement and hypoxia. After careful consideration, the decision was made to discontinue all curative interventions and life-sustaining measures, and the focus turned to palliative care and comfort measures. The patient passed away a few hours later.

The autopsy revealed disseminated mucinous adenocarcinoma of the colon with metastases to regional and retroperitoneal lymph nodes, liver, lungs and pleura. Furthermore, massive tumour necrosis was revealed, predominately in the liver, explaining rapidly progressing tumour lysis syndrome and liver failure.

DISCUSSION

With this case we describe the spontaneous onset of tumour lysis syndrome resulting in severe multiple organ failure in a previously healthy young adult suspected with disseminated cancer of unknown primary origin.

Spontaneous tumour lysis syndrome is a potentially life-threatening oncological emergency observed in patients with rapidly proliferating malignancies, caused by the destruction and lysis of malignant cells. Cell lysis results in the subsequent release of intracellular ions and metabolites into the bloodstream, causing severe hyperkalaemia, hyperphosphataemia, hypocalcaemia, hyperuricaemia, metabolic acidosis and eventually kidney failure. Other acute clinical manifestations include cardiac arrhythmias and neurological abnormalities. Furthermore, tumour lysis syndrome may be complicated by systemic inflammatory response syndrome,[9] a non-specific systemic response, triggered by a number of cellular, humoral and biochemical mediators. Both syndromes may lead to multiple organ failure, thereby increasing the risk of death. Major risk factors for spontaneous tumour lysis syndrome are haematological malignancies, large tumour burden, azotaemia and elevated level of lactate dehydrogenase.[9 10] Rapid progression of tumour lysis syndrome and organ failure in patients with suspected cancer can be managed with supportive care in the ICU using mechanical and pharmacological techniques of organ support, including ventilatory support, aggressive fluid and electrolyte management, renal replacement therapy and treatment with recombinant urate oxidase (rasburicase) to prevent renal failure.[11]

Adenocarcinoma of the colon is the most common histopathological type of CRC in western countries and in the USA, accounting for 98% of cancers of the large intestine. The cumulative risk of CRC in persons aged under 75 is 1.96% worldwide and 3.29% in Europe.[1 2] CRC is largely associated with a westernised lifestyle,[1] genetic risk factors including family history of CRC, familial adenomatous polyposis, hereditary non-polyposis CRC syndrome and personal history of inflammatory bowel disease.[3–5 8 12] CRC incidence is strongly related to age, with 90% of new cases registered in adults 50 years and older.[6 8 13] The number of young adults diagnosed with CRC has been increasing.[5 6 13] At the time of diagnosis 60% of young adults present at a more advanced stage (Duke's C and D stages[3 4 8]), with more aggressive and poorer differentiated tumours.[3 7 8] Benefits of screening programmes do not apply to younger patients, which may lead to treatment delay or misdiagnosis. Exactly when such patients deserve thorough evaluation with radiological imaging modalities or non-invasive diagnostic procedures remains to be decided.

Learning points

- Colourectal cancer (CRC) was not immediately visible on abdominal CT in the patient with metastatic CRC.
- Liver biopsy, postponed due to increased risk of bleeding, showed misleading signs of vasculitis.
- Disseminated cancer should be considered in patients with unexplained multiple organ failure and tumour lysis syndrome.
- Benefits of screening programmes do not apply to younger patients, presenting with symptoms or signs suspicious of tumour.

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Competing interests None.

Patient consent Obtained.

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