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Metabolic emergencies

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Abstract

Life-threatening metabolic complications observed in cancer patients are: hypercalcaemia, hyponatremia, hyperurcaemia, tumour lysis syndrome, hypoglycaemia, hyperuremia and hypercreatininemia secondary to renal failure, hyperammoniemia, lactic acidosis and adrenal failure. They may be associated with any kind of neoplastic disease causing dysfunction of vital organs, which can be determined by neoplastic spread, anti-cancer treatment or, more rarely, by paraneoplastic phenomena. The clinical presentation of metabolic complications is typically aspecific. Encephalopathy, raging from mild confusion to coma, is the most common and clinically most severe symptom. The severity of consciousness impairment is related to both the rate of onset and the magnitude of the metabolic disorder. The definitive diagnosis will be established by laboratory examination and radiological work-up. Cancer patients presenting metabolic should be referred to oncologic departments or intensive care units. The treatment of metabolic disorders include: prophylactic measures, emergency measures to preserve vital functions and to restore biological parameters and the treatment of the underlying primary.

Keywords: Hypercalcaemia; Tumour lysis syndrome; Metabolic emergencies

1. Introduction

1.1. General information

Life-threatening metabolic disorders in patients with cancer include: hypercalcaemia, hyponatremia, hyperurcaemia, tumour lysis syndrome, hypoglycaemia, hyperuremia and hypercreatininemia secondary to renal failure, hyperammoniemia, lactic acidosis and adrenal failure. Encephalopathy, ranging from mild confusion to coma, is the most common and most conspicuous clinical manifestation of metabolic emergencies. This frequent manifestation is, next to pain, the most common symptom found in patients referred to the Neuro-Oncology Unit of the Memorial Sloan-Kettering Cancer Center. Metabolic emergencies may occur in all cancers capable of causing dysfunction of vital organs, and thus, may be expected in every patient with generalized cancer.

1.2. Referral

Patients with metabolic emergencies need to be treated in a medical oncology department or in an intensive care unit (ICU). The department should provide facilities for cardiac monitoring and invasive haemodynamic monitoring, temporary cardiac pacing, ventilatory support and pump-controlled administration of infusions. Facilities for blood gas, haemoglobin and electrolyte measurements should be provided in the ICU or in the immediate vicinity. Facilities for haemodialysis or haematological rescue must be present.

1.3. Published reviews

See Refs. [2–4].

2. Diagnosis

2.1. Clinical section: diagnosis and physiopathology

Aspecific encephalopathy, ranging from confusion to coma, is almost invariably found as the main clinical manifestation of metabolic disorders. The severity of consciousness impairment is related to both the rate of onset and the magnitude of the metabolic disorder. With the exception of seizures – which may be generalized but also partial – and of a Babinski sign, the neurological examination will seldom reveal focal signs. The clinical presentation of metabolic encephalopathy is, thus, fairly unspecific. However, associated signs, such as dyspnea, cyanosis, icterus, hyperpnea (metabolic acidosis) or hypopnea (metabolic alkalosis), weakness and depressed reflexes, cardiac arrhythmia (hypokalemia and hypercalcemia) may provide clues as to the nature of the underlying metabolic disorder. The definitive diagnosis will be established by laboratory examination and radiological work-up. The main pathophysiological mechanisms of metabolic and toxic emergencies specifically related to cancer are:

(1) Dysfunction of vital organs, such as lung, liver, kidney and urinary tract caused by neoplastic spread. These complications are more common in the late stages of the neoplastic diseases.