Symptoms and signs compatible with neurocysticercosis in relation to preventive chemotherapy

Introduction

Preventive chemotherapy is a powerful tool against many neglected tropical diseases. Various preventive chemotherapy programmes for control of parasitic diseases, including those for taeniasis, schistosomiasis, clonorchiasis and opisthorchiasis, use praziquantel for treatment. However, there are different situations in which preventive chemotherapy using praziquantel (or consecutive doses of albendazole, as is the case for *Taenia solium*) are not recommended.

This document is designed for medical practitioners and programme staff working in areas endemic or potentially endemic for *T. solium*, to consider the circumstances in which preventive chemotherapy with praziquantel or consecutive doses of albendazole is not recommended because individuals show signs or symptoms compatible with the presence of *T. solium* larvae in the central nervous system (neurocysticercosis). In these cases, it is possible that the medicines could reach the central nervous system, causing an inflammatory reaction around the parasites, even though both medicines are used in much lower doses for preventive chemotherapy than for the clinical treatment of neurocysticercosis. Even at a low dose, it may be possible for these medicines to cause or aggravate potentially severe neurological symptoms, and precautions should be taken to prevent this and minimize risk.

Important points

- A significant proportion of patients with active neurocysticercosis (vesicular, viable) may be asymptomatic, at least for a few months/years. Thus, in endemic areas, it is very possible that some asymptomatic individuals have active disease.
- These asymptomatic patients may present with neurological symptoms, mainly during the first days after preventive chemotherapy. To detect and adequately manage these symptoms, active surveillance of adverse events is recommended for 3 days after preventive chemotherapy (i.e. 3 days after the last dose), followed by passive surveillance for at least an additional 7 days.
- Neurocysticercosis has no specific pathognomonic symptoms and diagnosis of the disease cannot be made by clinical assessment alone. Indeed, certain symptoms, shared by evolving intracranial masses of other origins (in particular tumours), should alert clinicians to the possibility of neurocysticercosis.
- In some preventive chemotherapy programmes, people who are not eligible for treatment with praziquantel might be offered other medicines, such as niclosamide, for the treatment of *T. solium* taeniasis.

Because of the risk of worsening symptoms, people with symptoms and signs compatible with neurocysticercosis should not receive preventive chemotherapy with praziquantel or consecutive doses of albendazole: they should be referred to medical facilities where the causes of their symptoms can be investigated.
Symptoms and signs compatible with neurocysticercosis

• **Epileptic seizures**: The main symptom of neurocysticercosis is epileptic seizures, especially when the parasites are located in the parenchyma, the most common location. In endemic communities, up to 70% of epilepsies can be due to neurocysticercosis, and epileptic seizures occur in 70% of patients with parenchymal disease. Neurocysticercosis-related epileptic seizures can happen in children, but they are one of the most common causes of late-onset epilepsy (after 20 years of age). Classically, focal signs of epileptic seizures include brief sensations of a peculiar smell, strong emotion, abdominal discomfort, brief involuntary movements or changes in the sensitivity of a limb. Automatic repetitive movements such as swallowing or chewing, without awareness, might also occur. Secondary generalization of epileptic seizures includes classic bilateral tonic–clonic seizures. All types of seizures (focal and generalized) can be observed in the case of neurocysticercosis-related epileptic seizures. Most of the patients do not have genetic susceptibility (they do not have relatives with epilepsy) or other risk factors for seizures (such as head trauma, alcohol abuse or neonatal hypoxia).

• **Headache**: The most common neurological symptom of neurocysticercosis in the general population is headache, but obviously not all people with headaches are suspected of having the disease. The specific situation in which headaches can be considered a symptom suggestive of neurocysticercosis is when the headaches are of progressive intensity, becoming severe and unresponsive to conventional pain relievers. Intracranial hypertension is the most feared cause of this symptom, in which other symptoms including nausea and sometimes vomiting, impaired vision (reduced visual acuity and/or diplopia) and drowsiness appear over time. These are alarming symptoms that should lead to urgent attention at a hospital.

• **Focal deficits**: Due to the mass effect or the inflammatory reaction around neurocysticercosis cysts, focal deficits may appear. Depending on the location of the cysts, the main deficits are decreased mobility or sensitivity of a limb, or ipsilateral limbs, decreased vision, impaired speech, and impaired balance (ataxia).

Symptoms and signs compatible with systemic cysticercosis

The presence of cysticerci outside the central nervous system may be associated with neurocysticercosis. In these cases, it is therefore not recommended to administer preventive chemotherapy using praziquantel or consecutive doses of albendazole.

• **Ocular cysticercosis**: This localization seems to be much more frequent in Asia than in other endemic countries. Ocular cysticercosis should be considered in the event of periocular swelling, restriction of ocular motility, diplopia, exophthalmos or ptosis of recent onset (a few months). Sometimes it can be confirmed by visualization of a typical intraocular cyst (vesicle with scolex as seen in Fig. 1). The non-recommendation of preventive chemotherapy in these cases is due both to the risk of worsening of the ophthalmic symptoms and to the possible association with neurocysticercosis.

• **Subcutaneous cysticercosis**: In this location, the cysticerci appear as spherical, smooth, mobile and firm swellings, 1–2 cm in diameter (Fig. 2). They are painless and non-inflammatory. Preventive chemotherapy does not represent a risk for this localization but, because it can be associated with neurocysticercosis, it is not recommended.
Fig. 1. Ocular cysticercosis

Fig. 2. Subcutaneous cysticercosis