Generalized Cysticercosis With Cardiac Involvement
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Abstract
We report a patient presenting disseminated cysticercosis characterized by cerebral, subcutaneous, muscular, and cardiac cysticercosis.

INTRODUCTION
Neurocisticercosis (NCC) is a parasitic infection of central nervous system (CNS) caused by the larval stage (Cysticercus cellulosae) of the pig tapeworm Taenia solium. This is the most common helminthes to produce CNS infection in human being. The occurrence of acquired epilepsy or a syndrome of raised intracranial pressure in a person living in or visiting a region where taeniasis is endemic or even in one living in close contact with people who have taeniasis should suggest a diagnosis of cysticercosis; the NCC may remain asymptomatic for months to years and sometimes its diagnosis is made incidentally when neuroimaging is performed. Symptoms and signs are related both to the parasite, and to the inflammatory-immunological response of the host. NCC is the most common cause of acquired epilepsy worldwide and most of the epileptic patients taking phenytoin, valprocic acid or carbamazepine regularly, respond very well. Fortunately, many problems related with NCC in our region are currently clarified. Disseminate presentations of this parasitic disease are not common in our region, one patient was previously reported by Bhigjee in 1999 and another patient who responded well to one-day treatment with praziquantel is reported by us.

CASE REPORT
A 48-year-old man admitted at Nelson Mandela Academic Hospital in Mthatha, South Africa presented with a history of recurrent generalized tonic-clonic epileptic seizures with urinary incontinence and foaming of five years duration. He reported to have fitted at home with three episodes on the admission day and sustained burns on the right leg while fitting (Figure 1). Patient was on oral carbamazepine 200mg 8 hourly, but he discontinued treatment 2 weeks back because medication was not available at the nearest medical clinic. PMH: unremarkable. Review of system: Respiratory, no caught, no dyspnoea. CVS: History of palpitations which started with onset of lumps on the chest. Genitourinary: decreased urinary output. Musculoskeletal: development of lumps involved the body at first associated with itching of skin. On general examination multiple subcutaneous and intramuscularly, mobile, no tender nodules, measuring from 0.7 to 2.5 cms, were palpable on the chest, back, abdomen, proximal regions of the four limbs and hemi-face (Figure 2-3-4-5). Respiratory and Cardiovascular system were normal except for a bradicardia of 46 beat per minute. During the battle between brain and heart, sometimes we could not identify who is shooting first. Is the heart (MI/arrhythmias) sending thrombi-embolic material to the brain (cardio-embolic stroke) or is the brain (insular NCC/stroke) sending bolus of autonomic neurotransmitter to the heart (subendocardial haemorrhage)? In systemic cysticercoids with cardiac involvement same question may be arising. Is cardiac's problem secondary to insular NCC (neurogenic heart) or due to direct damage by cysts (cardiac cysticercosis)? I think that along with this study the previous question may be answered.
bradicardia, II grade heart block and calcifications in papillary muscles and upper septum respectively (Figure 8). CT scan of the brain showed bilateral cystic lesions in vesicular and colloid stages, and calcified NCC.

**Figure 2**
Figure 2: Shows multinodular subcutaneous nodules on the chest.

**Figure 3**
Figure 3: Shows multiple nodular lesions on the back and an isolated nodule on the right lateral side of the chest.

**Figure 4**
Figure 4: Nodular lesions on the arm

**Figure 5**
Figure 5: Shows an uncommon nodular lesion on the left side of the face, removed for biopsy.

**Figure 6**
Figure 6: Bilateral plain X-ray of the humerus showing multiple calcified cigar-shape subcutaneous and muscular lesions on both arms.
**DISCUSSION**

Clinical Diagnosis Burn is still a common accident of epileptic patients while they have fit in rural areas. In places where electric power supply does exist, small fire inside the room is the only alternative way to survive in winter being also a source of accident for epileptic patients, and there is not permanent solution for this proper solution for this problem if poverty is not eradicated.

Diagnostic criteria for disseminated cysticercosis are based on the presence of NCC, subcutaneous (represent cysticercus in the skin), and muscular cysticercosis simultaneously. Unfortunately, little have been published on the medical literature about disseminate cysticercosis. China has the higher prevalence of subcutaneous cysticercosis worldwide probable because there also has the largest population but
scanty reports about disseminated cysticercosis from there provide limited information. Due to that lack of studies of correlation NCC-SC its percentage of occurrence is also ignored.

Ultrasoundography to diagnose subcutaneous cysticercosis was introduced by Wadia ET al, recently, they found some limitations to differentiated cysticercosis from lymphadenopathies, neurofibromas, and epidermoid cysts, and however we identified calcified subcutaneous nodules showing the scolex inside by ultrasound with no to many problems (Figure 7). X-rays studies were also useful by identifications of the typical cigar-shape calcifications on the subcutaneous tissue; positive serological test for cysticercosis supported our diagnosis. Final diagnosis is confirmed by biopsy of the subcutaneous nodules (Figure 9).

Takayanagui,16 reported a patient with an associated diffuse myalgia, fever, and normal creatine kinase level caused by degenerating cysts, similar situation in our patient was also observed. Maxillofacial cysticercosis is an uncommon appearance of a common disease reported recently, however, most of the patients presenting SC remain free of symptoms therefore we suggest anti-parasitic medication when there is clinical manifestation related to location of the nodular lesions or for cosmetic purposes. There is not enough accumulated experience about treatment with praziquantel for myocardial involvement in disseminated cysticercosis because only one report from Burkina Faso using albendazole has been made.

**CARDIAC INVOLVEMENT**

Alteration of the heart rate during a seizure is a well-known phenomenon caused by mesial temporal lobe and insular lesions and neurogenic heart. In one of the previous publications we report a case with well documented post-mortem examination and previous history of ictal tachycardia, ECG changes (prolonged QT interval and ST depression), and subendocardial haemorrhage (neurogenic heart). We concluded the insular of the right cerebral hemisphere may have a major role in cardiac autonomic control and we presented our graphical hypotheses about the neurogenic mechanism for ECG abnormalities found on that series (Table I).

![Image](image:10)

Neurogenic ECG alterations are often transient, but it cause diagnostic problems when mimicking acute myocardial infarction (MI). Some features of T waves may be suggestive of heart pathology, but they are non-specific, making it important to consider a neurogenic genesis to avoid unsuitable therapies. In cases of insular NCC, associated insular stroke, and ECG abnormalities such as: ST depression and inverted T wave or aberrant Q wave, can be difficult to get a differential diagnosis between insular ischemic stroke secondary to cardiac embolism (acute coronary syndrome) and cardiac damage (focal myocytolysis) secondary to increased local cardiotoxic catecholamine, increase production of 3',5'-cyclic adenosine monophosphate (cAMP) which causes the opening of the calcium channels resulting in the influx of calcium (and efflux of potassium ions), acting-myosin interaction with subsequent prolonged muscle contraction (calcium channels failure) and cell death due to intracellular metabolic derangement (subendocardial haemorrhages/focal myocytolysis) due to insular NCC and associated ischemic stroke. Its may be extremely difficult to perform taking into consideration that elevated cardiac enzymes and ECG abnormalities are present in both situations. Here if fractal dimensions of HRV confirm autonomic disturbance the more probable diagnosis may be neurogenic heart secondary to insular NCC and final diagnosis of cardiac damage related to coronary disease must be done by myocardial perfusion imaging (Thallium 201 or Technetium Tc 99m). Single-photon emission computed tomography (SPECT) imaging is indicated for patients with intermediated pre-test probability of coronary artery disease based on clinical history or results of previous exercise tolerance test, patients who cannot exercise or ECG shows exertional ST depression associated with left ventricular hypertrophy, other choices are cardiac magnetic resonance angiography with or without contrast or dobutamine, and Carotid intima-media thickness. We agree HRV is one of the most reliable test to confirm autonomic dysfunction of the heart, and we previously demonstrated that fractal dimension for HRV is even the best choice. In conclusion, cardiac problems secondary to disseminated cysticercosis affecting insular lobe, mesial temporal lobe or epilepsy with signs of neurogenic heart diagnosis can be suspected by the typical ECG abnormalities seen in neurogenic heart; if ECG does not shows these abnormalities and heart rate variability are normal then final diagnosis is cardiac cysticercosis supported by cardiac ultrasound. Treatment of choice is prevention of cysticercosis with a better primary health care system, health education, proper sanitation, better food hygiene, access to safe water and clean water, and eradication of poverty.
References

14. - Foyaca-Sibat H, Ibañez-Valdés LdeF, Mashiyi MK. Disseminated Cysticercosis. One-day treatment in a case
15. Wadia N, Deasi S, Bhatt M. Disseminated cysticercosis; new observations, including CT scan finding and experience with treatment by praziquantel. Brain 1988;111:597-614
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