

Sequel of Ring Enhanced Lesion on Computerized Tomographic Scans of Brain of Patients Presenting with Seizure

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A seizure for the first time in life with ring enhanced lesion (REL) in computerized tomographic (CT) scan is not an uncommon problem in a developing country. Only few studies have been done to assess the sequel of neurocysticercosis (NCC) presenting as REL on CT scan and even fewer studies to determine the duration of anti epileptic drug (AED) to be given in such patients with seizure.

This prospective, non-randomised, non-controlled clinical trial was undertaken to find out the sequel of NCC. We also aimed to find out whether AED needs to be continued irrespective of the sequel of the REL.

All the patients presenting with seizure due to REL on CT scan were shortlisted. Follow up was done for at least a year, from March 2007 to March 2008, after putting the patients on AED.

42 patients (21 males and 21 females) were finally short listed and followed up. Most of the patients were between 20 to 40 years of age. REL disappeared in 6 (14.2%), persisted in 3 (7.1%), and calcification occurred in the majority, i.e. 33 (78.6%). Only 9 patients could be taken off the AED as they became seizure-free on stopping the AED. The majority of the patients, i.e., 33 (79%) had to continue AED.

Most REL (NCC) on CT scan calcify and may need long term AED. Seizure due to NCC is a serious and a common cause of morbidity. A population based study is urgently needed.

Key words: AED, NCC, REL, Seizure

Seizure is a very common feature seen in neurological disorders.⁴ Patients presenting with some form of seizure for the first time in their life with evidence of REL in CT scan is not an uncommon problem in a developing country like Nepal. REL is due to Neurocysticercosis (NCC). NCC is the most common parasitic disease of the nervous system in humans and the single most common cause of acquired epileptic seizures in the developing world.^{10,11} In Nepal, too, NCC is very often the secondary cause of seizure presenting for the first time from young children to elderly population.

There have been very few good studies done in NCC so far; and practically no study has been done in Nepal about the sequel of NCC seen as REL on CT scan of the brain on subsequent follow up scan. There is no study so far to assess the duration of AED to be given to such patients even after the disappearance of NCC on CT scan. The pathophysiology⁵ of NCC is still not very clear. Seizure secondary to NCC is so rampant in our country that it cannot be ignored and most certainly cannot be taken for granted. A good study in this study is therefore much awaited.

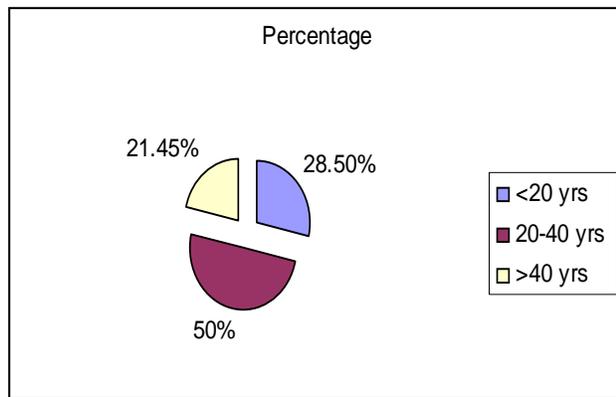


Figure 1. Age distribution of seizure disorder

We don't know for certain the prevalence of NCC in seizures; the diagnosis of NCC is also taken very loosely. The duration of AED to be given to such patients is even more controversial, not to mention the role of antihelminthic therapy⁵ to be given. Efforts have been made to address all these issues in this study. It is also our objective to find out whether AED need to be continued irrespective of the sequel of the REL.

Materials and Method

This prospective study is a non-randomized, non-



controlled trial to find out the sequel of NCC in patients presenting with seizure disorder. The study was conducted in a tertiary care clinic of a tertiary care hospital. The patients were included in the study after obtaining informed consent from all patients. The duration of follow-up was 1 year. The period of reoccurrence of seizure was noted. All the patients were subjected to MRI scan of the brain. History of seizure was confirmed by the patient or the witness by two independent examiners. Those patients with REL were short-listed and followed up for at least a year after putting them on AED. NCC was diagnosed on the basis of proposed diagnostic criteria.¹ Patients with history of new onset seizure of less than two weeks duration with minimal or no neurological deficit or without any evidence of raised intracranial pressure and those with normal birth and development history but without any family history of seizure disorder were included.^{8,9} Those with obvious symptomatic other secondary epilepsies, cases of stroke, space occupying lesions, granuloma and those with normal CT scan were excluded.⁹

As part of study protocol, no patients received corticosteroids throughout the study period. CT scan of brain was done every 3 or 6 month⁷ to observe whether the REL disappeared, calcified or produced gliosis of the brain

Figure 2. Sequel of ring enhanced lesions

parenchyma. Patients were also noted whether they still continued to have seizure or became symptom free, in those whose AED was finally stopped. Resolution of NCC was based on measurement of the largest diameter and graded as complete resolution when the lesion was not visible. NCC was considered to have *no resolution* when lesion remained the same or reducing less than 50%. *calcification* was considered on CT scan when plus 400 Hounsfield¹¹ was seen. Blood counts including ESR, X-ray chest, Montoux test, ELISA² for cysticercosis were routinely done in all cases.

Results

Forty two patients (21 males and 21 females) were finally short listed and followed up. Most of the patients were in the prime of their life, 50% (21) were between 20 to 40 years. 28.5% (12) were less than 20 years of age. Only 21.45% (9) were above 40 years of age (**Figure 1**). The majority of the patients 30 (71%) presented with focal motor seizure with secondary generalization. 12 patients (29%) presented with just focal motor seizure. REL disappeared in only 6 (14.2%), persisted in 3 patients (7.1%), and calcification occurred in the majority i.e. 33 (78.6%) (**Figure 2**).

Only 9 patients could be taken off the AED as they became seizure-free on stopping the AED. And the majority of the patients i.e. 33 (79%) had to be continued on AED either because of breakthrough seizure even after the disappearance of REL or because the REL continued to persist on re-scanning. Gliosis could not be determined on CT scan alone.

Discussion

It was seen that the majority of REL *calcified* and continued to *persist*⁸ in the CT scan; it was even more disturbing to learn that for the majority of the patients (79%), AED had to be part of their lives (at least during the study period) as the drugs could not be discontinued even when

the REL seemed to have disappeared on the follow up CT scan. The majority of the patients, as expected, presented with focal motor seizure with secondary generalization; and they were, unfortunately, in the prime of their life, as seen in many studies as well.⁴

We did not look into the prevalence of REL as it is a hospital based study; certainly, a population based study would have been a more appropriate for this.¹¹ But there is no doubt that the prevalence of NCC is alarming as it is the single most common cause² of acquired epilepsy in the developing world where prevalence is twice as much as in the developing world.

The difference between patients receiving antihelminthic treatment and those treated just with AED were not analyzed critically. However, we deliberately overlooked this part as many studies still show a controversial role of antihelminthic drug.⁴ A single or a multiple REL have not been differentiated; perhaps, in multiple REL, the lesions could persist longer needing longer duration of treatment with AED, and cause more morbidity.^{4,11} MRI would have been a better scanning tool; but we had to settle with CT,^{6,8} because it is much more cost effective. It is possible that some cases of seizure with normal CT could actually show NCC had MRI³ been used instead. There is no doubt that more research needs to be done, especially in the study of prevalence of NCC in Nepal. NCC is a huge health problem in the developing world. It compromises the quality of life and is the cause of much worry and definitely a huge economic burden. World health bodies need to take up this issue seriously and immediately create awareness to prevent NCC since it is clear that most of NCC calcify demanding long term AED. Moreover, NCC may grow out of hand and reach epidemic proportion in the developing world.

Conclusion

Many REL (NCC) in CT calcify and may need long term AED. Seizure due to NCC is a serious cause of morbidity, compromising the quality of life. International and national

health bodies need to address this significant public health problem immediately.

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