The open-ring sign

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A 12-year-old boy presented to us with subacute onset of progressive quadriparesis and blurring of vision in the right eye. His sensorium was normal. There was hyper-reflexia and spasticity in all four limbs and the plantar reflex was bilaterally extensor. Vision in the right eye was 6/18. The fundus examination was normal. Cerebrospinal fluid revealed normal sugar, normal cells with raised proteins (80 mg%) and raised IgG levels. His visual evoked potential study showed a delayed P100 peak of 130 ms in the right eye. The computer tomography (CT) scans showed bifrontoparietal ring-enhancing lesions with central hypodensity [Figure 1]. On magnetic resonance imaging (MRI), the lesions were hypointense on the T1WI [Figure 2], hyperintense on the T2WI [Figure 3] and showed incomplete ring enhancement on the postcontrast study [Figure 4]. The ring was complete towards the white matter and broken towards the cortex. This gave the appearance of an open ring – the ‘open-ring sign.’ The patient was started on intravenous methyl-prednisone and showed rapid recovery. To the best of our knowledge, only two such reports have described this sign so far.
Ring-enhancing lesions pose a common diagnostic challenge. This sign is invaluable in differentiating demyelination from other similar lesions, which usually show complete ring enhancement. The ring is complete towards the white matter, indicating active demyelination. An open-ring pattern of enhancement is more likely to be associated with demyelinating lesions than nondemyelinating lesions. In one study, the likelihood ratio of demyelination versus neoplasm averaged 5.2, and vs infection, 17.2. Moreover, the specificity in diagnosis was approximately 90%. 

References
