

## Natural History and Management of Incidentally Discovered Focal Brain Lesions of Uncertain Etiology in Children

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### Introduction

The discovery of incidental brain lesions in children has increased recently due to the widespread usage of neuroimaging. A standardized surveillance and management guideline following the discovery of these lesions remains non-existent.

### Methods

Pediatric patients with incidentally discovered brain lesions on MRI indeterminate for low-grade neoplasm, presenting to our institution between 2000-2016 were retrospectively reviewed. Data were obtained regarding imaging changes over time, symptoms, management plans, and histopathology.

### Results

We identified 445 patients with incidental brain abnormalities, of whom 182 had lesions indeterminate for low-grade neoplasms. Average age at diagnosis was 11.1 (SD=4.08) years and average follow up was 3.6 years (range 8 months to 13.2 years). A single lesion was detected in 149 patients, 33 patients had multiple lesions. Lesions showed no progression in 141 patients (77.5%), while progression was detected in 39 patients (21.4%). Mean time to progression was 29 (SD=24.5) months. A change in management was made in 20/182 patients (11%), and included surgical resection (n=17), biopsy (n=2) and lumbar puncture (n=1). Males were more like to have progression (p=0.003) and surgical intervention (p=0.006). Location was not predictive of progression (p=0.27), however, lobar lesions were more likely to undergo surgery (p=0.01). Size was not significantly associated with progression (p=0.14). Median geometric diameter of lesions that did not undergo surgery was 6.5mm, whereas that of surgically resected lesions was 11.6mm (p=0.0006). Contrast enhancement was associated with both progression (p=0.02) and subsequent surgery (p=0.0003).

### Conclusions

The majority of pediatric incidental lesions concerning for neoplasms have an indolent, benign course. For asymptomatic patients, with stable lesions lacking contrast enhancement, we recommend conservative management using MRI and clinical examinations at 6, 12 and 30 months following diagnosis, and an MRI scan at a later time point to detect late-onset progression.

### Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Identify the increasing incidence of incidentally discovered brain lesions on brain MRI resembling low-grade gliomas, their most common locations, mode of discovery and associated symptoms.
- 2) Identify the natural history and clinical course of incidental brain lesions in children.
- 3) Learn the association between the clinical course and the following covariates: lesions' location, size, imaging characteristics, symptoms.
- 4) Discuss the recommended management scheme for incidental brain lesions.