5-aminolevulinic acid fluorescence-guided resection of intramedullary ependymoma: report of 9 cases.

Inoue T, Endo T, Nagamatsu K, Watanabe M, Tominaga T.

Abstract

BACKGROUND: Resection guided by 5-aminolevulinic acid (5-ALA) fluorescence has proved to be useful in intracranial glioma surgery. However, the effects of 5-ALA on spinal cord tumors remain unknown.

OBJECTIVE: To evaluate the usefulness of 5-ALA fluorescence-guided resection of intramedullary ependymoma for achieving maximum tumor resection.

METHODS: This study included 10 patients who underwent surgical resection of an intramedullary ependymoma. Nine patients were orally administered 5-ALA (20 mg/kg) 2 hours before the induction of anesthesia. 5-ALA fluorescence was visualized with an operating microscope. Tumors were removed in a standardized manner with electrophysiological monitoring. The extent of resection was evaluated on the basis of intraoperative findings and postoperative magnetic resonance imaging. Histopathological diagnosis was established according to World Health Organization 2007 criteria. Cell proliferation was assessed by Ki-67 labeling index.

RESULTS: 5-ALA fluorescence was positive in 7 patients (6 grade II and 1 grade III) and negative in 2 patients (grade II). Intraoperative findings were dichotomized: Tumors covered by the cyst were easily separated from the normal parenchyma, whereas tumors without the cyst appeared to be continuous to the spinal cord. In these cases, 5-ALA fluorescence was especially valuable in delineating the ventral and cranial and caudal margins. Ki-67 labeling index was significantly higher in 5-ALA-positive cases compared with 5-ALA-negative cases. All patients improved neurologically or stabilized after surgery.

CONCLUSION: 5-ALA fluorescence was useful for detecting tumor margins during surgery for intramedullary ependymoma. When combined with electrophysiological monitoring, fluorescence-guided resection could help to achieve maximum tumor resection safely.

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