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Residual Pituitary Adenomas after Surgical Treatment: Improved Depiction with Gadobenate Dimeglumine Compared to Gadopentetate Dimeglumine

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Purpose

Pituitary adenomas account for 10-15% of all intracranial primitive neoplastic lesions. Surgical debulking is often the first approach to management. However, residual adenomatous tissue after surgery can be detected in up to 50% of cases and is clearly associated with a high risk of tumor recurrence. Gamma knife surgery is frequently a good therapeutic option in these cases since the risk of damage to surrounding structures is minimal. In order to remove as much of the recurrent tumor as possible, accurate depiction of the residual tumor tissue is critical. Gadobenate dimeglumine (MultiHance; Bracco) has markedly greater r1 relaxivity in blood compared to traditional contrast agents because of weak and transient interaction with serum proteins. Numerous studies have shown that lesion enhancement and available diagnostic information is greater on gadobenate dimeglumine-enhanced images (1-3). However, little is known of the potential of gadobenate dimeglumine for improved depiction of residual pituitary adenoma. This preliminary study was performed to intraindividually compare gadobenate dimeglumine with gadopentetate dimeglumine at equivalent dose (0.1 mmol/kg bodyweight) for MR imaging of residual pituitary adenoma in patients who previously had undergone surgical treatment.

Materials & Methods

Institutional review board and regulatory approval were granted; written informed consent was obtained for all patients. Fifteen patients (6 males, 9 females) with residual pituitary adenoma amenable to gamma knife surgery were enrolled. Patients underwent two MR examinations at 1.5 T separated by 48 hours. The imaging parameters were identical for the two studies. Contrast agent administration was fully randomized: 10 received gadobenate dimeglumine for the first examination and gadopentetate dimeglumine for the second while the remaining five patients received the two agents in the reverse order. The first of the two examinations was performed after positioning the stereotaxic helmet. The volume and injection rate were identical for the two examinations. Images were evaluated in terms of lesion morphology, dimension and border delineation, degree and pattern of lesion enhancement, and definition of the involvement of nearby structures (e.g., cavernous sinuses). Overall preference for one examination over the other was assigned in blinded fashion in terms of lesion detectability and diagnostic confidence.

Results

Gadobenate dimeglumine was considered superior to gadopentetate dimeglumine in 11/15 patients whereas gadopentetate dimeglumine was superior to gadobenate dimeglumine in just 3/15 patients. For the remaining patient the two agents were considered equivalent. Where a preference for gadobenate dimeglumine was expressed, the choice was due primarily to greater contrast enhancement and better lesion border definition both of which led to improved depiction of the residual pituitary adenoma.

Conclusion

Improved depiction of residual pituitary adenoma on follow-up MR imaging after surgical treatment is achievable with gadobenate dimeglumine compared to gadopentetate dimeglumine. The improved depiction of residual tumor may permit more accurate definition of the surgical target volume for subsequent gamma knife surgery.

References

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