Objective

To develop an asleep motor mapping paradigm for accurate detection of the corticospinal tract during glioma surgery and compare outcomes with awake patients undergoing glioma resection.

Methods

A consecutive cohort of adult patients undergoing craniotomy for suspected diffuse glioma with tumor in a perirolandic location who had awake or asleep cortical and subcortical motor mapping with positive areas of motor stimulation were assessed for postoperative extent of resection (EOR), permanent neurological deficit, and proximity of stimulation to diffusion tensor imaging–based corticospinal tract depiction on preoperative magnetic resonance imaging. Outcome data were compared between asleep and awake groups.

Results

In the asleep group, all 16 patients had improved or no change in motor function at last follow-up (minimum 3 months of follow-up). In the awake group, all 23 patients had improved function or no change at last follow-up. EOR was greater in the asleep group (mean [SD] EOR 88.71% [17.56%]) versus the awake group (mean [SD] EOR 80.62% [24.44%]), although this difference was not statistically significant ($P = 0.3802$). Linear regression comparing distance from stimulation to corticospinal tract in asleep ($n = 14$) and awake ($n = 4$) patients was $r = -0.3759$, $R^2 = 0.1413$, $P = 0.1853$, and 95% confidence interval = −0.4453 to 0.09611 and $r = 0.7326$, $R^2 = 0.5367$, $P = 0.2674$, and 95% confidence interval = −7.042 to 14.75, respectively.

Conclusion

In this small patient series, asleep motor mapping using commonly available motor evoked potential hardware appears to be safe and efficacious in regard to EOR and functional outcomes.