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Short Communication

A Colombian-based survey on ventriculostomy and intracranial pressure monitor placement practices

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Abstract

Objective: Monitoring of intracranial pressure (ICP) is a routine procedure in the neurosurgery field. Although the routine practice of monitoring ICP has decreased in recent years, the practice patterns have not been studied in Colombia. This study was designed to evaluate the current practice for ventriculostomy and ICP monitoring by neurosurgeons in Colombia.

Methods: An 11-question electronic survey was delivered to 380 practicing neurosurgeons. Demographic information and rates of proper ventriculostomy placement for monitoring of ICP were described.

Results: Fifty-one percent of practicing neurosurgeons responded to the survey (response rate 13.4%). The rate of successful cannulation of the ipsilateral ventricle ranged from 70% to 100%.

Conclusion: This survey shows that Colombian neurosurgeons have similar tendencies to other developed countries. Prospective studies are necessary to establish actual evidence-based practices.

Keywords: Neurotrauma surgery, Survey, Intracranial pressure, Neuromonitoring, Neurosurgeons

Introduction

Traumatic brain injury is one of the major causes of mortality and morbidity among the general population. There are several interventions to reduce the sequela associated with traumatic brain injury. One of them is monitoring intracranial pressure (ICP). There is inconsistency as established by the Brain Trauma Foundation (BTF) guidelines for the lack of controlled studies that are adapted to the characteristics of each region or country. There are few published reports in the literature regarding evaluating trends of using ICP monitoring by neurosurgeons and until this date there is no published study focused on monitoring in brain traumatic injury in Colombia (1-4). In order to assess the current state of Colombian neurosurgeon trends on ventriculostomy and the use of monitoring of ICP for neuronal trauma, this survey was conducted.

Methods

To determine the current practice patterns of Colombian neurosurgeons in ventriculostomy, we developed a web-based structured survey with real time results through an online survey creator (http://www.encuestafacil.com). The survey invitations were sent via email, and aimed neurosurgeons who managed patients with brain traumatic injury to meet its management in relation to national and international guidelines on head trauma, from September of 2015 to October of 2015. For ethical considerations, it was decided not to reveal the identity of any of the neurosurgeons who participated in the survey. We used dichotomous choice questions, and multiple choice questions with single answers. The evaluated variables were: experience, occupation, place of training and use of ventriculostomy and placement of ICP monitor. A Microsoft Excel database (Microsoft, Redmond, Washington) was used to compile and enter the answers from the survey. Each answer to a question was placed in a corresponding category and the frequencies of each category were computed. The data were analyzed by SPSS software version 17.0 (SPSS. Inc., Chicago, IL). The data obtained were analyzed statistically and the frequency distribution of each variable was determined.

Results

Fifty-one neurosurgeons completed the survey, all neurosurgeons worked in Colombia. The majority of the respondents had more than 10 years of experience (68.6%; n = 35), ≤5 years (13.7%; n = 7), 5-10 years (17.6%; n = 9). When asked about occupation, 51 (100%) were active

neurosurgeons. We asked about the place of neurosurgical training, Colombia (70.5%; n = 36), South America (21.5%; n = 11), and North America (3.9%; n = 2). When required to place a monitoring device for ICP, the preferred technique was: external ventricular derivation (EVD) (76.4%; n = 39), intraparenchymal monitor (17.6%; n = 9), other (5.8%; n = 3).

Regarding the average of EVD surgery per month: one/month (25.5; n = 13), two/month (23.5%; n = 12), three/month (23.5%; n = 12), four/month (15.7%; n = 8), other (5.9%; n = 3), none (5.9%; n = 3). We asked about the number of intraparenchymal monitor placing surgery per month: one/month (19.6%; n = 10), two/month (13.72%; n = 7), three/month (9.8%; n=5), four/month (3.9%; n = 2), other (7.8%; n = 4), none (45%; n = 23). We also asked about the most common used techniques: hand-free technique (82.35%; n = 42), Ghajar Guide (11.76%; n = 6), image guided system (0%; n = 0), none (3.92%; n = 2), other (1.96%; n = 1). Other concern for evaluation was the consideration of preferences in the hospital for the procedure, critical care unit (1.96%; n = 1) and operating room (98.0%; n = 50). We asked about the average of attempts for cannulation of ventricle and placement of a ventricular catheter, 1 attempt (47.0%; n = 24), 1-3 attempts (49.0%; n = 25), 3-5 attempts (0%; n = 0), none (3.92%; n = 2). We asked about the average of attempts of colleagues; 1 attempt (17.64%; n = 9), 1-3 attempts (70.58%; n = 36), 3-5 attempts (1.96%; n = 1), other (9.8%; n = 5). Regarding the frequency of cannulation of ipsilateral ventricle, 10% (7.84%; n = 4), 20% (0%; n = 0), 30% (1.96%, n = 1), 40% (1.96%, n = 1), 50% (5.88; n = 3), 60% (5.88; n = 3), 70% (3-92%; n = 2), 80% (23.52%; n = 12), 90% (23.52%; n = 12), 100% (25.49%; n = 13). Finally, we asked about the routine use of image studies to confirm the localization of ventricular catheter, yes (64.7%; n = 33), no (35.29%; n = 18).

Discussion

Brain monitoring is an important tool for the management of traumatic brain injuries. It is also used for subarachnoid hemorrhage, intracerebral hematoma, hepatic failure, meningitis, stroke and encephalopathy, among other pathologies (5-8). Invasive monitoring of ICP has some risks. There may be complications such as infection (<14%), bleeding (<3%), and malfunction of the device. Retrospective studies have shown a worse prognosis type using ICP monitoring (prolonged mechanical ventilation, high risk of pneumonia, acute kidney injury and increased mortality). Despite the work of Chestnut, who conducted a prospective study in which he reported that the use of ICP is no better than using image studies and clinical examination in the intensive care management of traumatic brain injury, these results cannot be extrapolated in all the cases. (9-15). The BTF recommends the use of ICP monitoring for the management of patients with neuronal trauma. Among the indications listed by the BTF guidelines are: severe head injury (GCS <8 and abnormal CT scan), severe head injury (GCS <8 + normal CT) if 2 of the following are present: age >40 years, blood pressure (BP) <90 mm Hg and abnormal motor posturing. Several studies have shown variable levels for management of neuronal trauma. Our survey shows that the EVD is the preferred technique for ICP monitoring in patients with traumatic brain injury (16-21). We found that using techniques such as Ghajar Guide is infrequent, perhaps because of the high cost of this system in a country with limited resources such as Colombia. ICP monitoring has been associated with a decrease in mortality by 12% and 6% to have a favorable outcome when compared with patients managed with less invasive treatment.

Conclusion

This survey shows the current practice of ventriculostomy and placement of ICP monitors in Colombian neurosurgeons. Our research shows that Colombian neurosurgeons have similar tendencies to other developed countries. As relevant conclusion, as a fact, more prospective studies are necessary to establish strong evidence-based practices regarding the management of ventriculostomy and ICP monitoring.

Ethical issues

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

Authors' contributions

Conception and design: LRMS, AMR. Critically revising the article: all authors. Reviewed submitted version of manuscript: all authors.

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