Predicting the Development of Postoperative Symptoms of Idiopathic Intracranial Hypertension based on Preoperative Radiologic Findings

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ABSTRACT

Objective: To determine if patients with spontaneous cerebrospinal fluid (CSF) rhinorrhea developed symptoms consistent with idiopathic intracranial hypertension (IIH) after surgical repair of their CSF leak and if this correlated with the presence of preoperative radiologic findings indicative of preoperative optic nerve traction.

Design: Retrospective analysis at tertiary care academic hospital.

Patients: Fourteen consecutive patients identified retrospectively who underwent operative repair of CSF rhinorrhea from January 2000 through December 2007.

Main Outcome Measure: Preoperative radiographic images were analyzed for the presence of signs associated with IIH. A telephone survey was then carried out to determine the prevalence of the post-operative development of symptoms associated with IIH. The data were analyzed and correlated through statistical analysis.

Results: 14 patients were identified with an average age of 53.4 years and an average BMI of 34.7. A high percentage of patients demonstrated evidence of empty sella (60%), arachnoid pits (66.7%), or the presence of a meningoencephalocoele (66.7%). 2/14 patients developed both post-operative headache or tinnitus that was new, worse, or of a different character than preoperatively. No visual changes were noted. Four patients had recurrence of their meningoencephalocoele requiring additional operation(s). Analysis revealed no correlation between radiographic findings and the development of post-operative symptoms. While increased BMI was associated with the presence of a meningoencephalocoele (p < 0.05), there was no other statistically significant predictor of radiographic findings or post-operative symptom development.

Conclusions: Patients with spontaneous CSF rhinorrhea commonly display findings consistent with IIH, however development of post-operative symptoms are rare and cannot be predicted by demographic or radiographic factors.

INTRODUCTION

Development of cerebrospinal fluid (CSF) rhinorrhea manifests with either continuous or intermittent watery rhinorrhea often associated with headaches, due to decreased intracranial CSF volume. Most commonly, these fistulae develop as a result of accidental or iatrogenic trauma. Approximately 5% of these fistulae, however, develop spontaneously and without obvious etiology. Clinical correlations have been made between patients with idiopathic CSF leaks and the condition known as idiopathic intracranial hypertension (IIH), characterized by the constellation of obesity, progressive tinnitus, vertigo, and vision loss secondary to elevated intracranial pressures. Recent studies have also linked these patients to IIH by observing radiographic findings suggestive of increased intracranial pressure including meningoceles, arachnoid pits, empty sella, increased peripptic and optic nerve tortuosity.

METHODS and MATERIALS

Following institutional review board approval, the medical records at the University of Virginia were searched for all patients who were seen and underwent an operation for a diagnosis of cerebrospinal fluid rhinorrhea between January 2007 and December of 2008. ICD-9 code 349.81 and CPT codes 31290 and 31291 were used to aid in this search. Patients were then excluded if an etiology for their CSF leak could be determined. Fourteen patients were identified whose leaks were considered idiopathic and their records were then further combed for demographic data including age (current and at time of leak), height, weight and co-morbid conditions. Imaging from these patients, including MRI, CT, and CT cisternogram were reviewed by 2 neuroradiologists for the following findings associated with increased intracranial pressure: arachnoid pits, dural ectasia, empty sella, increased peripptic CSF, optic nerve tortuosity, and sceral flattening.

RESULTS

Of the 8 patients who experienced new post-operative headaches, none (0/8) had worsening postoperatively.

2 of 6 patients experienced new post-operative headache, both described as pulsatile, and associated with nausea.

1 of these 2 had >4 findings of increased ICP on preoperative imaging.

TINNITUS DATA

Of the 4 patients with preoperative tinnitus, none had worsening or change in their tinnitus post-operatively.

2 of 14 had new onset tinnitus following repair.

1.2/ had > 4 findings of intracranial hypertension on imaging.

VISION DATA

Of the 5 patients with preoperative visual changes, none (0/5) experienced worsening with surgical correction.

DISCUSSION

Elevated intracranial pressure is a difficult etiology to prove in the setting of spontaneous cerebrospinal fluid rhinorrhea because of the pressure reducing effect of the leak itself. As such, only after closure can a true pressure reading be obtained. This would require either prolonged lumen drain placement or a separate lumbar tap exposing the patient to increased discomfort. Further, it is not entirely clear how long it might take for the pressure to reaccumulate after repair given the pathologic production or clearance of CSF. As a result, various small series of patients have been evaluated indicating a probable connection between the presence of disease entities, CSF rhinorrhea and IIH. However, little has been written regarding the long term effects of repair in these patients with regards to the development of non-leak symptoms such as tinnitus, vision loss, and headaches and/or how aggressively for which their appearance should be monitored. Our study is the first to attempt to examine the likelihood of development of these latent effects of repair that might be attributable to IIH.

Our data indicate that a minor percentage of the patients will develop findings of elevated ICP with 14% (2/14) developing new headache, 14% (2/14) developing new onset tinnitus, and no patients developing any worsening in their vision per their subjective report.

Problems with our analysis include solely the use of a radiographic data as a surrogate marker for IIH in lieu of actual pressure measures given the retrospective nature of the analysis. Further, use of peripptic adjuctive measures such as acetazolamide or shunting were not well accounted.

CONCLUSION

Given the overlap in clinical picture and radiographic findings IIH remains a likely etiology for spontaneous CSF rhinorrhea. It appears from the data that a small but not insignificant percentage of patients will develop symptoms after repair of such leaks indicating that these symptoms should be screened for as part of the regular follow up course.

As our analysis revealed no statistically significant correlation between radiographic findings and the development of post-operative symptoms the question of whether IIH is responsible for all cases of spontaneous CSF rhinorrhea is raised. While not supported statistically, patients with 3 or more radiographic signs suggestive of IIH may be at a greater risk of developing either post operative symptoms or leakage requiring shunting of CSF.

REFERENCES


ADDITIONAL INFORMATION

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