Cranial nerve palsy

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Cranial nerve palsy (CNP) refers to the dysfunction or impairment of one or more of the cranial nerves, which are a set of 12 nerves that emerge directly from the brain or brainstem. These nerves control various functions related to the head and neck, including sensation, movement, and autonomic functions.

Epidemiology

Cranial nerve palsies (CNPs) can occur across various demographics and are associated with a wide range of underlying causes. Here's a brief overview of the epidemiology of cranial nerve palsies:

Incidence and Prevalence: The overall incidence and prevalence of CNPs vary depending on the specific cranial nerve affected, the underlying cause, and the population studied. CNPs can occur in isolation or as part of a broader neurological condition. For example, Bell's palsy, which affects the facial nerve (cranial nerve VII), is one of the most common CNPs, with an annual incidence of around 20-30 cases per 100,000 people.

Age: Some CNPs may have age-related patterns. For instance, Bell's palsy commonly affects individuals between the ages of 15 and 45, with a peak incidence in the third decade of life. Conversely, other CNPs, such as those related to neurodegenerative diseases or vascular conditions, may occur more frequently in older individuals.

Gender: The incidence of CNPs may also show gender disparities in certain cases. For example, Bell's palsy has been reported to be slightly more common in pregnant women and individuals with diabetes, and there may be slight variations in the incidence of other CNPs between genders.

Underlying Causes: CNPs can result from a variety of underlying causes, including trauma (e.g., head injury), infection (e.g., viral infections such as herpes zoster), inflammation (e.g., autoimmune disorders like Guillain-Barré syndrome), vascular disorders (e.g., stroke), tumors (e.g., acoustic neuroma), or congenital abnormalities. The distribution of CNPs by cause may vary in different populations and settings.

Geographical Variation: There may be geographical variations in the incidence and prevalence of CNPs due to differences in risk factors, healthcare access, and environmental factors. For example, certain infections associated with CNPs may be more prevalent in specific regions.

Ethnic and Racial Differences: Some CNPs may exhibit ethnic or racial differences in incidence or severity. For example, certain hereditary neuropathies or genetic disorders associated with CNPs may be more common in specific ethnic groups.

Understanding the epidemiology of CNPs is crucial for identifying risk factors, guiding clinical management, and implementing preventive measures. However, due to the heterogeneity of CNPs and the diverse underlying causes, further research is needed to elucidate the epidemiological patterns of specific cranial nerve palsies across different populations and settings.

Classification

see Oculomotor nerve palsy

see Trochlear nerve palsy

Cranial nerve palsy (CNP) secondary to cerebrospinal fluid diversion is less familiar to us as a result of its rarity in incidence and insidiousness in presentation.

Etiology

CNP can occur due to a variety of causes, including trauma, infection, inflammation, vascular disorders, tumors, or compression of the cranial nerves. The symptoms of CNP depend on which cranial nerve is affected and the severity of the dysfunction.

Cranial nerve palsy (CNP) is a common complication of traumatic brain injury (TBI).

Retrospective observational studies

Despite a high incidence of traumatic brain injury in Nepal (382 per 100,000), literature on the specific traumatic brain injury management and traumatic brain injury outcome of CNP is lacking. This study aimed to examine the outcomes of TBI patients involving single versus multiple CNP.

A retrospective chart review of 170 consecutive TBI patients admitted to the tertiary neurosurgical center in Nepal between April 2020 and April 2022 was conducted. Demographic, clinical, and etiological characteristics; imaging findings; and management strategies were recorded, compared, and analyzed using descriptive statistics. The Glasgow Outcome Scale Extended (GOSE) was used to measure the outcomes in two groups of patients (single and multiple CNP) at 3 months.

Out of 250 eligible patients, 80 were excluded and CNP was noted in 29 (17.1%) of the remaining 170. The median age was 34.9 years, and falls (60.6%) were the most common cause of trauma. TBI severity was categorized based on GCS: mild (82.4%), moderate (15.9%), and severe (1.8%). Cranial nerve involvement was seen in 29 (17.05%) patients: single cranial nerve involvement in 26 (89.65%)

and multiple nerve involvement in 3 (10.34%). The most common isolated cranial nerve involved was the oculomotor nerve (37.9%). CT findings revealed a maximum of skull fractures with no significant association between CNP and CT findings.

CNP is a common consequence of TBI with the most common etiology being falls followed by RTA. Single CNP was more common than multiple CNP with no significant difference in the outcome in the 3-month GOSE score. Further research is needed to determine the burden of traumatic CNP and establish specific management guidelines for different types of CNP [1)]

Case series

From June 2012 to February 2015, 5 of 347 consecutive patients with CNPs secondary to different CSF diversion procedures were treated at The First Hospital of Jilin University, Changchun, Jilin, China.

A systematic PubMed search of published studies written in English for patients developing CNPs after CSF diversion procedures from January 1950 to June 2015 was conducted.

Overall, 29 studies and 5 patients of the current series totaling 53 CNPs met the inclusion criteria. CN II, III, IV, V, VI, VII and VIII were got involved in 2 (3.8%), 2 (3.8%), 5 (9.4%), 1 (1.9%), 44 (83.0%), 4 (7.5%) and 1 (1.9%) patients respectively. Thirty-eight patients (71.7%) developed CNPs following inadvertent lumbar puncture, 8 (15.1%) following lumbar drainage, and 7 (13.2%) following ventriculoperitoneal shunt. Forty-eight (90.6%) patients got resolved completely.

The proposed mechanism of CNP after CSF diversion procedure is cerebrospinal fluid hypovolemia and subsequent downward displacement of the brain and traction and distortion of the vascular and peripheral neural structures. As a result of its distinct anatomic characteristics rather than long intracranial course, CN VI is most commonly affected. With early recognition and timely conservative management, most patients could get favorable recovery [2)]

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Kumari K, Gautam N, Parajuli M, Singh S, Pradhananga A, Sedai G, Shilpakar S, Sharma MR. Outcome of patients with traumatic cranial nerve palsy admitted to a university hospital in Nepal. Chin Neurosurg J. 2024 Apr 1;10(1):9. doi: 10.1186/s41016-024-00361-8. PMID: 38556895.
2)
Li G, Zhu X, Zhang Y, Zhao J, Han Z, Hou K. Cranial nerve palsy secondary to cerebrospinal fluid diversion. Clin Neurol Neurosurg. 2016 Apr;143:19-26. doi: 10.1016/j.clineuro.2016.02.010. Epub 2016 Feb 9. PubMed PMID: 26882270.