A review of central nervous system lymphomas diagnosed at a single tertiary referral neuroscience centre.

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Introduction

Primary central nervous system lymphoma (PCNSL) is a rare, aggressive form of non-Hodgkin lymphoma that develops within the brain, spinal cord, eye or leptomeninges without systemic involvement. There has been an increasing incidence of PCNSL in patients older than 60 years, with an annual incidence rate of 0.5 per 100,000 in the United States[i]. Approximately 95% of PCNSL cases are classified as diffuse large B-cell lymphoma (DLBCL). The median overall survival (OS) of patients with PCNSL in the United States doubled from 12.5 months in the 1970s to 26 months in the 2010s, however this was limited to patients under the age of 70 years[ii].

Aims

This study aims to identify the incidence, demographics and presentation of those diagnosed with PCNSL in Cork University Hospital (CUH) over a 10 year period, and examine the pathology and outcomes of these patients.

Methods

This was a retrospective chart review. The research described in this project was formally approved by the Clinical Research Ethics Committee of the Cork Teaching Hospitals. The Apex database was used to record demographical, clinical and pathological information of the selected patients, along with their outcome. Descriptive data analysis was conducted and Kaplan-Meier survival analysis was used to examine overall survival.

Results

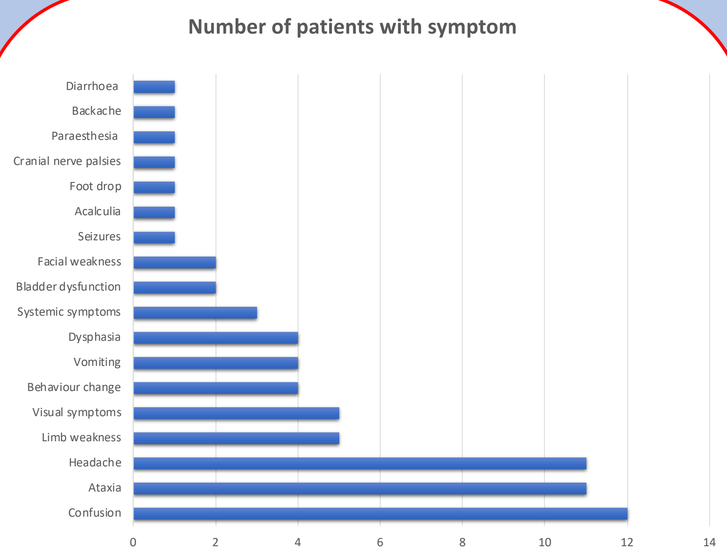
This study identified 74 patients diagnosed with lymphoma on brain or spinal biopsy from January 2011 to December 2020. The Apex database then showed 50 patients had true PCNSL, while the other 24 patients had systemic lymphoma that had metastasised to the brain.

Of the fifty cases of PCNSL, twenty-six (52%) were male and 24 (48%) were female. The median age at diagnosis was 65.5 years.

CUH Neuroscience centre caters for the greater Munster area, which has a population of 1.2 million people. The incidence rate was calculated as 0.417 per 100,000 people.

Confusion (34.3%), ataxia (31.4%) and headache (31.4%) were the most common presenting symptoms. Visual symptoms were present in five (14.3%) patients, which included nystagmus, eye pain, visual loss and blurred vision.

Results

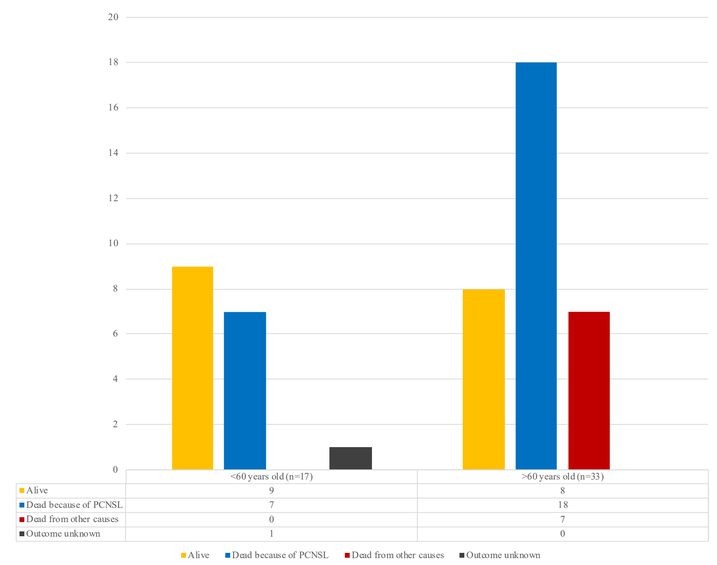


The haemoglobin, white blood cell count (WBC), lactate dehydrogenase (LDH) and cerebrospinal fluid (CSF) protein at diagnosis was collected where possible. The haemoglobin was abnormal in nine (34.65%) men and two (9.1)% women. The WBC results were abnormal in 35.42% of patients (n=48). LDH levels were available for thirty-one patients and 64.52% were abnormal. Only twelve patients had a CSF protein taken for analysis. 75% of these were abnormal, all of which were high. The mean was 1830.9 mg/L and the median was 591.5 mg/L.

The most common radiological site of lesion was supratentorial, with thirty-six of fifty patients (72%) having their lesion in that location. Nine patients (18%) had lesions in the deep regions of the brain, four patients (8%) had spinal lesions and only one patient (2%) had a infratentorial lesion.

Forty-nine (98%) patients had DLBCL on histology. There was one case (2%) of immunodeficiency-associated CNS lymphoma which was EBV positive. All patient's histology (n=50) tested positive for CD20, forty-one (82%) tested positive for BCL6 and thirty-nine (78%) tested positive for MUM1.

The outcome of all patients was collected, except for one patient whose outcome is unknown as there were no notes or records available for this patient beyond 2013. Of the 49 patients, seventeen are alive (34.7%), twenty-five are dead because of PCNSL (51%) and seven are dead from other causes (14.3%).



Mean survival time until death from all causes as assessed by Kaplan-Meier survival analysis was 41.7 months and the median was 27.9 months. However, mean survival time until death specifically from PCNSL was 52.5 months and the median was 32.6 months.

When survival time was assessed by gender, it showed the survival time was lower for the female population. The mean was 39.99 months for death from PCNSL and the median was 17 months. Whilst the mean survival time until death from PCNSL for the male population was 56.95 months and the median was 49.4 months.

Discussion

Main Findings:

- The incidence rate was 0.417 per 100,000.
- There were 50 patients diagnosed with PCNSL over a 10 year period.
- 24 patients were initially thought to have PCNSL, however the majority of them had systemic lymphoma that spread to the CNS.
- The mean age and age range was lower in males.
- 52.9% of patients under the age of 60 are alive.
- 24.1% of patients over the age of 60 are alive.
- The mean survival time until death from PCNSL was 52.5 months.
- The median survival time until death from PCNSL was 32.6 months.
- The mean overall survival was longer in males at 56.5 months, compared to 39.99 months in the female population.

In 2020, Beaumont Hospital in Dublin published their own study examining PCNSL[iii]. The results are compared on the table below.

	Cork University Hospital	Beaumont Hospital
Time period	2011-2020	2007-2017
Approximate population of catchment area	1.2 million	3.6 million
Number of cases	50	149
Incidence	0.417/100,000	0.4/100,000
Median age at diagnosis	65.5	66
Gender spilt	52% male, 48% female	46% male, 54% female
Most common presenting symptoms	Confusion, ataxia, headache	Confusion, headache, paresis
Location of lesions		
Supratentorial	72%	83.9%
Infratentorial	2%	14.7%
Spinal	8%	0.7%
Other	18%	0.7%
Histological diagnosis		
DLCL	98%	86%
Immunodeficiency-associated CNSL	2%	10%
Other	0	4%
Immunohistochemistry of DLBCL and immunodeficiency-associated cases		
CD20	100%	100%
CD79a	42%	97.4%
CD10	24%	30.3%
BCL6	82%	84.1%
MUM1	78%	95.7%

Conclusions

In conclusion, PCNSL is an aggressive form of non-Hodgkin lymphoma and this retrospective chart review examined those diagnosed with this disease in CUH over a ten year period. The incidence rate was 0.417 per 100,000. There may be a diagnostic challenge in distinguishing metastasised systemic lymphoma from PCNSL. DLBCL was the most common subtype and there was a wide range of presenting symptoms. Survival analysis showed males had a slightly longer median survival time until death from PCNSL than females.

References

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