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A clinical study of Papilloedema among the patients presenting in a tertiary care hospital of Vijayapur

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Abstract: *Background:* Any condition which causes increased intracranial pressure can result in Papilloedema, of which greatest number are due to Meningitis and Tumours of Brain. Papilloedema is much more frequently observed in children than in older people. It can cause various visual field defects of which concentric enlargement of blind spot is most common. Papilledema may lead to diagnostic difficulties in its different stages. It should be differentiated from optic neuropathies and structural abnormalities of optic disk known as pseudo Papilloedema. This study was done for evaluating causes of Papilloedema and to study age, sex and causal distribution of Papilloedema. *Methodology:* This Descriptive, Observational study was conducted in Department of Ophthalmology, in our Hospital from September 2021 to September 2022. Detailed history was recorded. Assessment of anterior segment via slit lamp biomicroscopy was done. Depending on cause of Papilloedema, CT or MRI scan of head was done. Ancillary investigations like CBC, CSF analysis and other blood investigations were done whenever required. *Result:* A total of 50 patients with Papilloedema were included in the study. Maximum number of patients belonged to third and fourth decade. Bilateral papilloedema was usual presentation. The major etiological factor was Meningitis followed by brain tumours and other causes. *Conclusion:* Papilloedema is seen in all age groups but is more common in younger and middle age groups. Meningitis and Brain Tumours were major etiological factors for Papilloedema. Tuberculous meningitis causes Papilloedema more often than any other form of meningitis.

Keywords: Papilloedema, Intracranial pressure, Meningitis, Tumour.

Introduction

The Brain devotes more cells and connections to vision than any other sense or motor function [1]. The dominant role of vision in human may be expressed numerically by considering, for example, the number of axons in the human optic nerve (approximately 1.2 million), as compared to with the axons in the acoustic system (31,000). Thus, the ratio of afferent neurons in the aural system is roughly 40:1. It has been estimated that the optic nerves comprise about 40% of all fibers that enter or exit the brain [1].

Despite advances in neurodiagnostic imaging and other techniques, examination of the afferent visual sensory system is still the core of the neuro-ophthalmologic examination [1]. Optic nerve head is the only nerve in the body that is available for examination live, both in the healthy, as well in the state of disease. This is made possible by the various available methods of examination i.e. Direct ophthalmoscopy, Indirect ophthalmoscopy and Slit lamp biomicroscopy with corneal contact lens or +78D, +90D condensing lenses. In addition, fundus photography and fluorescein angiography have made it possible to permanently record the state of the optic disc both in health and disease and thus enable one to evaluate the disc wherever it shows either a progression or regression of the disease process [1].

The optic nerve is myelinated by oligodendrocytes rather than Schwann cells and is covered by meninges. So, it is considered analogous to the white matter of brain rather than to peripheral nerve [2-3]. As it is covered by meninges, any cause of intra cranial hypertension also causes optic nerve oedema termed as "Papilloedema". The optic

disc may become oedematous in a variety of conditions, but the most important place where the ophthalmologist help is sought for is Papilloedema due to raised intracranial pressure. A full-blown picture of Papilloedema may not be a problem to appreciate. But, it is the alertness and accuracy of the ophthalmologist that is required to appreciate incipient Papilloedema which signals the warning, well before any permanent damage occurs intracranially [4].

Ophthalmologist has a definite role to play in collaboration with the neurologist and neurosurgeon so that necessary investigations are completed well before a final decision is taken regarding the treatment. A decompression for a Papilloedema should be performed before optic atrophy sets in or at least during its very early stages. Otherwise a restoration of the visual function is no longer possible [4].

In chronic atrophic Papilloedema, the patient may first consult an ophthalmologist for rapidly deteriorating vision and the ophthalmologist may be the first to suspect a brain tumour. Such tumours are mostly in a relatively silent part of the brain and have an early tendency to cause an internal hydrocephalus. In such cases, surgical removal of the tumour may not be followed by any functional improvement. On the contrary, in some patients there may be catastrophic drop of vision, even resulting in total bilateral blindness. Papilloedema remains asymptomatic for such a long time and that it becomes noticeable only when the dreadful signs of atrophy have already developed, indicating a condition that generally will not improve with active neurosurgical interference but frequently will even become worse [5].

It is the ophthalmologist's responsibility to correctly distinguish disc edema due to raised intracranial pressure from other conditions of disc, which give rise to similar appearance.

Nowhere in neuro-ophthalmology is fundoscopic differentiation more critical for once a pronouncement of Papilloedema is made, course of neurodiagnostic procedures become inevitable, and patient, usually a child or young adult, as well as family members, endure the suspicion of brain tumour. It is imperative that a case of Papilloedema is diagnosed correctly and early, so that not only the vision but many a times, patient life is saved. The present study is an exercise in this regard.

Material and Methods

Place of Study: This Descriptive, Observational study was conducted in the Department of Ophthalmology, in our college from September 2021 to September 2022.

Data was sourced through:

i. Outpatients of Eye Department
ii. Inpatients of Eye Department
iii. Inpatients and outpatients of various other departments who were referred to the Ophthalmology Department for fundus examination. A total of 50 cases of Papilloedema, were taken up for the present study.

Inclusion Criteria: Patients of either sex, in all age groups, diagnosed with Papilloedema of any duration were included for the study.

Exclusion Criteria: Following patients were excluded for the study;

i. Patients having blurring of disc margins due to Pseudopapilloedema.
ii. Patients with optic disc oedema other than due to Papilloedema.
iii. Patients with optic atrophy other than due to Papilloedema

Method of Study: An informed consent was obtained in every case. A standard case protocol was maintained which included a complete detailed history and thorough clinical examination. Each patient was evaluated as follows (Depending on the general condition of the patient).

History: A detailed history was obtained about the general and ocular complaints. The emphasis being laid on complaints related to raised intracranial pressure like headache, vomiting, transient visual obscuration, diplopia, diminution of vision, fever, neurological symptoms, hypertension, etc. The patient was also enquired about the past history, drug history, personal and family history. Depending on the cases, patients were asked leading questions to find out the

associated risk factors for the etiology of Papilloedema. All the above complaints were noted in terms of mode of onset, duration, and progression, aggravating and relieving factors.

Examination: A complete clinical examination included general, ocular and neurological examination. Ocular examination included head posture, ocular posture, extraocular movements including ductions and versions. Using the slit lamp, the anterior segment was examined in detail. Pupillary reaction to direct and consensual light was given special emphasis.

For each eye visual acuity was recorded individually, which included both unaided and best corrected visual acuity. Ishihara pseudo-isochromatic plates were used to check Colour vision for each eye separately. Whenever the general condition of the patient permitted, Field of vision was recorded for each eye separately using automated perimeter. Diplopia charting was done for each eye separately. Fundus examination was done using direct ophthalmoscope and indirect ophthalmoscope. Fundus photographs were taken. General and systemic examination was done giving more importance to CNS examination

Investigations: Depending on the cause of Papilloedema, CT or MRI scan of the head was done. Ancillary investigations like complete blood count, CSF analysis and other blood investigations were done whenever required. After a final diagnosis was established, all the patients were referred back to appropriate departments for further management.

Results

A series of 50 patients with Papilloedema were studied in the Department of Ophthalmology over a period of 12 months from Sept 2021 to Sept 2022. The results are analysed below:

Figure-1 shows that in the present study, the age group ranged from 0 years to 70 years. Maximum number of patients belonged to the third (26%) and fourth decade (26%).

Fig-1: Age Distribution

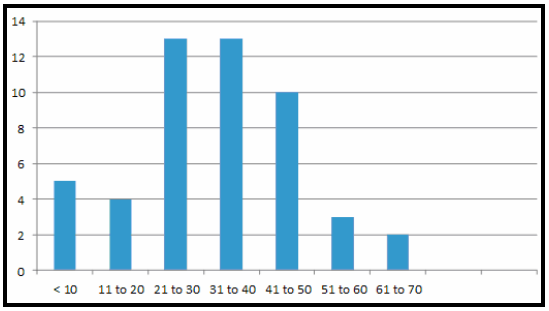

Table-1: Sex Distribution		
Males	**Females**	**Total**
20(40%)	30(60%)	50(100%)

Table 1 shows among the 50 cases, 20(40%) were males and 30 (60%) were females. The male to female ratio was 2: 3.

Fig-2: Etiology of Papilloedema in the present study

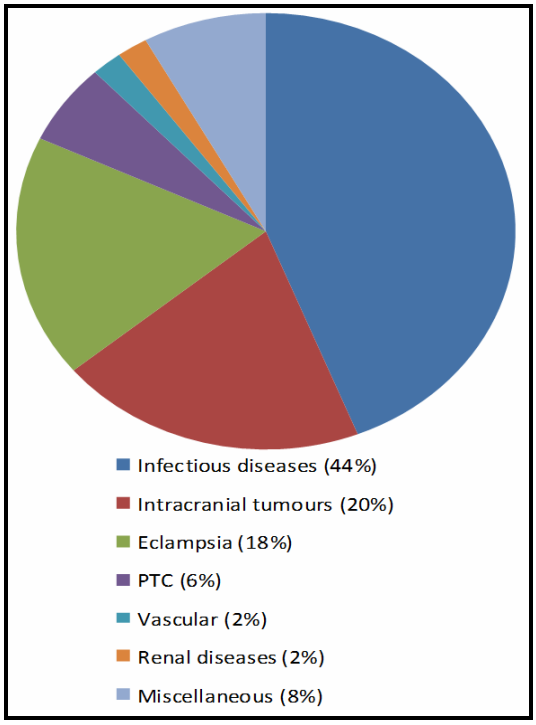

Figure-2 shows among the 50 cases, most common etiological factor was Meningitis 22 cases (44%) of which Tubercular Meningitis was the major group 18 cases (36%).

Fig-3: Etiology with respect to different age groups

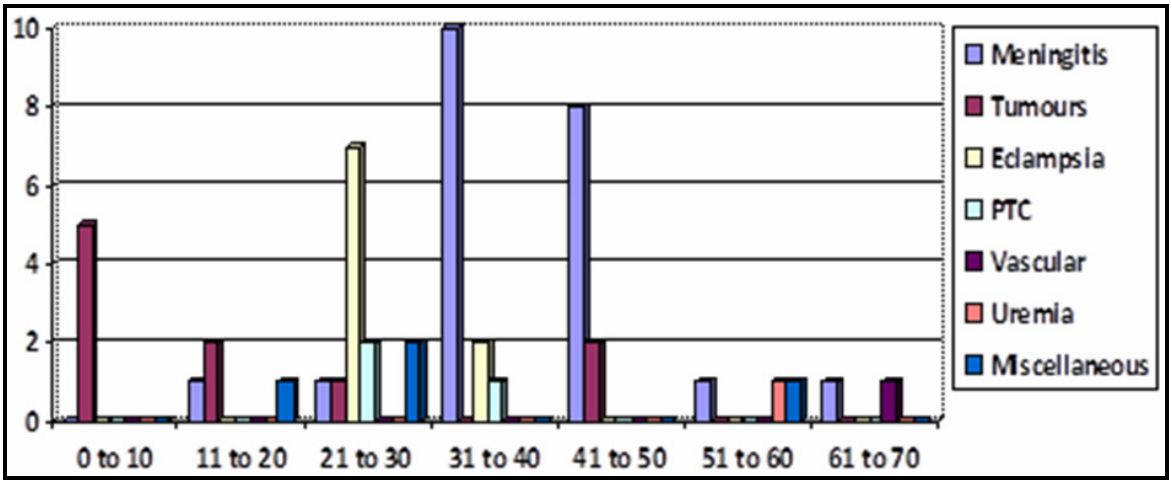

Figure-3 shows that, in the present study, most of the patients with Infectious diseases (meningitis) belonged to age group 31-50, and most of patients with tumours belonged to age group 0-10. PTC patients were mostly in their third and fourth decade of life. Eclampsia patients were understandably seen in the reproductive age group.

Fig-4: Tumours causing Papilloedema - Locations

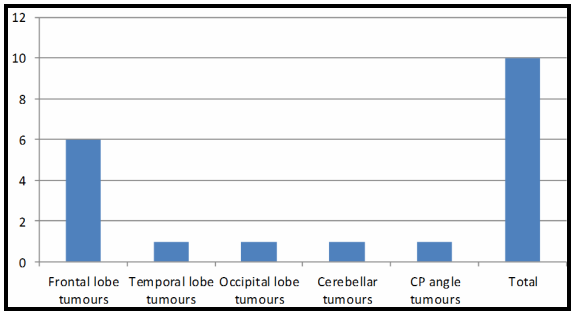

Figure-4 shows in the present study, majority of the tumours causing Papilloedema were frontal lobe tumours constituting 06 out of 10 tumours (60%) and 12% of the total number of cases.

Table-2: Miscellaneous causes of papilloedema	
Subdural hematoma	01
Subarachnoid Haemorrhage	02
Cerebellar abscess	01

Table 2 shows that there were 2 cases of subarachnoid haemorrhage and one case each of subdural hematoma and Cerebellar abscess which were confirmed by CT brain.

Table-3: Infectious causes of Papilloedema	
Tubercular meningitis	18
Bacterial meningitis	03
Viral meningitis	01
Total	22

Table 3 shows that there were 22 cases of Papilloedema due to infectious causes. All these were confirmed by CSF analysis. Tubercular meningitis was seen in 18 out of 22 cases which accounted for 81.81% of infectious causes and 36% of the total cases.

Discussion

In the present study, all the patients with Papilloedema were studied in respect to their age, sex and causal distribution. The results of the present study were compared with earlier studies and discussed.

Age Distribution: In the present study, maximum number of patients (72%) were in the age group of 21-50 years, with 10% between 0-10 years and 04% between 61-70 years. According to the study of Bonamour, Bregeat, Bonnet and Judge in 1968, amongst the study group of 624 patients, Papilloedema was much more frequently observed in children than in older people [6].

- 81% in the age group between 1-5 years.
- 43% in the age group between 60-70 years.

Bonamour et al. were of the opinion that the relative frequency of choked discs in children could be explained by the special character of infantile cerebral tumours (infratentorial seat, early blockage of CSF circulation, rapid growth) and by the soft nature of the disc tissue and its vessels. In elderly men, Papilloedema was rarely found or may even be completely absent (rarity of cerebral tumours at this age, sclerosis of disc tissue) [6]. The present study may not be strictly comparable with the above study because of a small sample size.

Sex Distribution: The male to female ratio in the present study was 2:3 with female preponderance. This can be ascribed to the large number of Eclampsia patients in the study. But otherwise, Papilloedema has no predilection towards any sex.

Etiological factors: In the present study, majority of the cases were due Infectious causes of Papilloedema, which was mainly due to Meningitis cases constituting 22 out of 50 cases (44%). In the meningitis cases, tubercular meningitis was seen in 18 out of 22 cases (81.81%). It was followed by brain tumours (20%) with supratentorial tumours constituting 80% and infratentorial tumours constituting 20%. Eclampsia cases constituted 9 out of 50 cases (18%), followed by 3 cases due to Pseudotumor cerebri (6%).

According to Uhthoffs study among 1126 patients, 75% of the cases of Papilloedema were due to brain tumours perhaps because the etiologic factors are frequently superimposed (volume of tumour + oedema of the brain + hydrocephalus). The above figures are not in concordance with the present study probably because the number of intra cranial tumours referred to our institute is far too less. But, still intra cranial tumours are the second major etiological cause for Papilloedema in this study**.** According to Huber (1976) who studied 1166 patients with brain tumours, 698 (59%) patients showed Papilloedema - supratentorial tumours accounting for 60% and infratentorial tumours accounting for 70% [5].

However the present study may not be strictly comparable with the above study because of the small sample size.

Uhthoff (1915), Paton (1935) and Van Wagenen (1928) observed that anteriorly situated tumours often produced Papilloedema despite lack of obstruction of the aqueduct [7-8]. In the present study; frontal lobe tumours, which are anteriorly situated, constituted 06 out of 10 (60%) tumour cases.

Hartmann and Guillaumat (1938) studied the ocular fundi of 1169 patients with proved intracranial tumours and found that gliomas produced Papilloedema in 76% of cases while meningiomas produced Papilloedema in only 40%. On the other hand, Huber found Papilloedema in 50% of patients with rapidly growing and malignant glioblastomas. In patients with slowly progressive benign astrocytomas and meningiomas, Papilloedema occurred in 65% and in patients with cerebral metastases, Papilloedema occurred in 61% [5].

Huber felt that these numbers suggested a slightly greater tendency for the development of Papilloedema in those patients with slowly progressive tumours rather than those that were malignant and rapidly growing [5]. In the present study, gliomas were seen in 02 out of 10 tumours constituting 20% of the tumour cases and 04% of the total number of Papilloedema cases. Meningiomas were seen in 04 out of 10 tumour cases constituting 40% of the tumour cases and 08% of the total Papilloedema cases.

Infectious causes: There were 22 cases of Papilloedema due to infectious causes. Among the 22 cases, Tuberculous meningitis was seen in 18 out of 22 cases, which accounted for 81.81% of the infectious causes and 36% of the total cases. Hanna et al. (1981) studied 2,178 cases of meningitis and found that the prevalence of Papilloedema was 2.5%. There was a higher prevalence of Papilloedema in patients with TB meningitis than in other types of bacterial meningitis including meningococcal, pneumococcal and influenzal [9]. The present study shows a fairly good correlation with the above study despite a small sample size.

Pseudotumor cerebri: Pseudotumor cerebri was seen in 03 cases constituting 06% of the

total cases. All 3 patients visual field tests revealed enlargement of the blind spot and generalized constriction of the peripheral visual fields. In the study conducted by Wall M and Dollar JD over 50 PTC patients, most frequently detected visual field abnormalities were blind spot enlargement, generalized field constriction and nasal defects [10]. Visual field defects in the present study correlates well with the above study.

Ireland et.al enumerated many risk factors for the development of PTC, which include obesity, female gender, pregnancy, drug intake and abrupt withdrawal and many infectious diseases [11]. Keeping this study as a reference, PTC patients were evaluated for the presence of any associated risk factors.

Radhakrishnan et al, a prospective case control study on the epidemiology of PTC revealed the annual incidence of PTC as 0.9 out of 100,000 in general population, rising to 3.5 out of 100,000 in women aged 15-44 years and 19.3 out of 100,000 in women aged 20-44 years, who are 20% or more above their ideal body weight [12]. In the present study, all 3 of PTC patients were females and out of them 2 were obese (66.6%). The minimum age of the patient in the study was 24 yrs and maximum was 35 yrs. Despite the small sample size, it correlates very well with the above study, which reveals 20 times more incidence rate of PTC in obese females of reproductive age group. IIH typically affects obese women of childbearing age, but it may be seen in patients of any age, in either sex, and without obesity [13]. Digre et. al has studied in pregnancy and has reported pregnancy to be a risk factor in development of PTC [14]. In the present study all 3 patients of Pseudotumour cerebri had past history of pregnancy.

Eclampsia: In the present study, there were 09 cases of eclampsia out of 50 cases constituting 18%. Bonamour G has observed that 28% of the eclampsia patients show Papilloedema despite lack of obstruction to CSF outflow [6]. The present study correlates well with the above study where eclampsia is the third major cause of Papilloedema.

Miscellaneous causes: In the present study, there was a case each due to subdural hematoma, cerebellar abscess, Hypertensive Encephalopathy, Uremia and 2 cases of Subarachnoid Hemorrhage which all together constituted 06% of all Papilloedema cases. All the above causes are listed as miscellaneous causes of Papilloedema in the study conducted by Hayreh SS, HayrehMS [15].

Conclusion

The following conclusions were drawn from the present study; Papilloedema is seen in all age groups but is more common in younger and middle age groups. Infectious cause was the major etiological factor for Papilloedema. Among the infectious causes, tuberculous meningitis was more common which reflects the continued prevalence of tuberculosis in this part of the region. Among the brain tumours, frontal lobe tumours were predominant despite their anterior location and lack of obstruction of the aqueduct. Eclampsia is the major cause of Papilloedema under the Metabolic and Endocrine disorders. Hypertensive Encephalopathy, Chronic Uraemia, subdural hematoma and subarachnoid haemorrhage can also cause Papilloedema.

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