ORIGINAL RESEARCH

Clinical profile of patients with raised intracranial pressure admitted at a Tertiary Care Hospital

[1]Dr. Udaykumar J Khasage, [2]Dr. MahadevDiggi, [3]Dr. Akash Reddy, [4]Dr. Mahesh Krishnamurthy

[1]Associate Professor, Department of Emergency Medicine, BLDE, Vijayapur, Karnataka, India
[2]Assistant Professor, Department of Emergency Medicine, Adichunchanagiri Institute of Medical Sciences, Mandya, Karnataka, India
[3]Assistant Professor, Department of Emergency Medicine, SDM Medical College, Dharwad, Karnataka, India
[4]RMO, Institute of Gastroenterology Sciences and Organ Transplant, Victoria Hospital Campus, Bangalore, Karnataka, India

Corresponding Author
Dr. Mahesh Krishnamurthy
RMO, Institute of Gastroenterology Sciences and Organ Transplant, Victoria Hospital Campus, Bangalore, Karnataka, India

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ABSTRACT
It proposed that the brain and its contained blood are in compressible, confined within the nearly rigid skull, the total volume of which remains constant. Later, cerebrospinal fluid (CSF) was taken into account as another cranial compartment when the concept of reciprocal volume changes between blood and CSF was introduced by Burrows. The study conducted in patients coming to the Emergency Department with suspicion of raised Intra cranial pressure. Present study of 100 cases 44 patients were having vomiting,34 were having headache, 18 were having both vomiting and headache,only 4 cases were not having either headache or vomiting. In present study of 100 cases 91 cases were having normal fundoscopic study of them 77 were having raised ICP,and 9 cases were having papilledema on fundoscopy,all 9 cases were having raised ICP. In present study of 100 cases 21 were diagnosed as having CVA of them 18were having raised ICP,63 were arrived with RTA of them 56 were having raised ICP, meningitis were accounting for least number of cases those are 16 in number, of them 12 were having raised ICP.

Keywords: Raised intracranial pressure, clinical profile, CSF

INTRODUCTION

Intracranial pressure (ICP) is the pressure inside the skull and thus in the brain tissue and cerebrospinal fluid (CSF). ICP is measured in millimetres of mercury (mmHg) and, at rest, is normally 7–15 mmHg for a supine adult. The body has various mechanisms by which it keeps the ICP stable, with CSF pressures varying by about 1 mmHg in normal adults through shifts in production and absorption of CSF.[1]

The classical Monro-Kellie doctrinewas the first step to describe intracranial hemodynamics. It proposed that the brain and its contained blood are in compressible, confined within the nearly rigid skull, the total volume of which remains constant. Later, cerebrospinal fluid (CSF) was taken into account as another cranial compartment when the concept of reciprocal volume changes between blood and CSF was introduced by Burrows. Within an intact skull, the total volume is controlled at a relatively fixed level by various homeostatic mechanisms. An increase in volume in any single compartment of the skull, therefore, creates a pressure gradient in the other compartments. This simply means that an increase in one of these compartments causes a reduction in one or both of the remaining two[2].

The brain parenchyma occupies 80-85 per cent of the total intracranial volume (1200-1600 cc.) The remaining space is filled with blood (100-150 cc) and CSF (100-150 cc). Blood and CSF, which form around 20 per cent of the intracranial volume, are capable of rapid extra cranial displacement. The fluid content of the brain parenchyma, intra- and extracellular fluid, may also change due to pathological conditions or medical treatments. These four fluid volumes have the key role in preserving the volume equilibrium of the intracranial space.[3,4]

METHODOLOGY

Study design

- Study design was hospital based prospective study.

Study period and duration

- The present study was conducted for the period of 18 month

Source of the data

- The study conducted in patients coming to the Emergency Department with suspicion of raised Intra cranial pressure.

Sample size

- A total of 100 cases with suspected raised ICP were taken for the study.

Sample method

- Sample size for the study was calculated considering the 80% of the average past 3 year hospital statistics.

INCLUSION CRITERIA

All patients above the age of 18 years coming to ED With

- Head injury
- Cerebro vascular accident
- Meningitis

EXCLUSION CRITERIA

- Patients with Ocular trauma
- Patient with Optic neuritis
- Patients with Optic Nerve tumour
- Glaucoma

All investigations and interventions were done under direct supervision and guidance of our guide.

RESULTS

Table 1: Distribution of study participants according to seizure

Seizure	Frequency	Raised ICP
Absent	47	39
Present	53	47
Total	100	86

In present study of 100 cases 53 cases were having seizure at the time of arrival to hospital and during the hospital stay, among them 47 cases were having raised ICP,and 47 casesdid not haveseizure among them 39 were having raised ICP.

Table 2: Distribution of study participants according to headache/vomiting

Symptoms	Frequency studied	Raised ICP
V	44	38
H	34	29
H-V	18	15
A	4	4
Total	100	86

Present study of 100 cases 44 patients were having vomiting,34 were having headache, 18 were having both vomiting and headache,only 4 cases were not having either headache or vomiting.

Table 3: Distribution of study participants according to abnormality of pupil

Pupil	No.of patient	Raised ICP
Abnormal	75	65
Normal	25	21
Total	100	86

In present study of 100 cases 75 cases were having abnormal pupil among them 65 were having raised ICP and 25 cases were having normal pupil of them 21 were having raised ICP.

Table4:Distribution of study participants according to respiratory abnormality

Respiratory	Frequency	Percentage
N	10	7.0
T	70	63.0
B	20	16
Total	100	86

In present study of 100 cases,20 were having bradypnea of them 16 were having raised ICP, 70 cases were having tachypnea of them 63 were having raised ICP, and 10 cases were not having any respiratory abnormality of them 7 were having raised ICP.

Table 5: Distribution of study participants according to fundus examination

Fundus examination	Frequency	Raised ICP
Normal	91	77
Papilledema	9	9.0
Total	100	86

In present study of 100 cases 91 cases were having normal fundoscopic study of them 77 were having raised ICP,and 9 cases were having papilledema on fundoscopy, all 9 cases were having raised ICP.

Table 6: Distribution of study participants according to diagnosis

Diagnosis	Frequency	Percentage
CVA	21	18
Mn	16	12
RTA	63	56
Total	100	86

In present study of 100 cases 21 were diagnosed as having CVA of them 18were having raised ICP,63 were arrived with RTA of them 56 were having raised ICP, meningitis were accounting for least number of cases those are 16 in number, of them 12 were having raised ICP.

DISCUSSION

Early detection and prompt treatment of raised ICP is essential. However, it may pose challenges at the same time. Invasive ICP monitoring is the gold standard. It is associated with complications. Regular assessment and comparison by computed tomography (CT) in critically ill-patients is fought with dangers of transporting to radiology.

The optic nerve, as a part of the central nervous system, is surrounded by a subarachnoid space and distends in raised ICP.OSD is measured by ultrasonography to identify patients with raised ICP.

Table 7:Comparison of sex with raised ICP with other study

Study	Male (%) raised ICP	Female(%) raised ICP	Total cases of raised ICP(%)
Goel*et al*[5]	67	22	89
Present study	65	21	86

In the present study,65% male and 21%females had raised ICP,comparable to study done by Goel*et al*, 100 adults were enrolled in the study, including 72 men and 28 women with a median age of 28 years, of 72 male 67 were having positive finding of USG guided OSD, among 28 female 22 were having positive finding of of USG guided OSD

Table 8: Comparison of cause for raised ICP with other study

Mode of injury	RTA(%)	CVA(%)	Meningitis(%)	Total cases of raised ICP(%)
Goel*et al*[5]	55	16	18	89
Present study	56	18	12	86

In the present study USG guided raised ICP was observed in 56 patients with RTA, 18 with CVA and 12 with meningitis and the study is comparable to study conducted by Goel*et al*. The modes of injury were motor vehicle collision in 60 cases among them 55 were positive for OSD, cerebro vascular accident in 20 among them 16 were positive for OSD and bacterial meningitis in 20 among them 18 were positive for OSD. There were total 89 participants showing evidence of intracranial hypertension on OSD as defined earlier (mean OSD of 5 mm or more).

Table 9:Comparison with GCS

GCS	GCS≤8	9 to 12	≥13
Sodatos T *et al*[6]	25	35	40
Present study	47	12	41

In present study of 100 cases, 47 patients had GCS≤8, 12 cases had GCS 9 to 12, and 41 cases had ≥13, andamongst them 90 cases were having clinical features of raised ICP,86 patients had raised ICP on USG,and 90 cases having features of raised ICP on CT brain, andthestudy iscomparable tothe study conducted by Sodatos T *et al*. The study population had a median Glasgow Coma Scale (GCS) score of 11 (range 6-15); 40 participants had mild brain injury

(GCS 13-15), 35 had moderate brain injury (GCS 9-12) and 25 had severe brain injury (GCS 8 or less).

Table 10:Comparison with CT finding and clinical feature

Study	Clinical feature of raised ICP	Raised ICP in CT brain
Sodatos T *et al*[6]	96	70
Present study	86	90

Clinical features of raised ICP were observed in 96 cases and confirmed by CT in 70 cases in a study by Sodatos*et al*. In present study, clinical features of raised ICP seen in 86 cases and 90 cases were having features of raised ICP on CT brain.

CONCLUSION

- Most clinical feature was vomiting in 44 cases, out of which 38 were positive for raised ICP, followed by Headache in 34 cases, out of which 29 were positive for raised ICP on USG guided OSD.
- Both headache and Vomiting was seen in 18 cases and 15 out of these were tested positive for raised ICP on USG guided OSD.
- In 4 out of 100 cases studied there were no symptoms, and all four patients had raised ICP feature on USG guided OSD.
- Next common clinical features were tachypnoea and bradypnoea

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