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A Retrospective Study on Cerebral Infractions and Drug Utilization Review in Meningitis Patients at Terittory Care Hospitals

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ABSTRACT:
Stroke is one of the leading causes of death in world-wide. Cerebral infraction is one of the complication observed in meningitis patients. **Aim**: The primary aim of our study is to identify cerebral infractions in meningitis patients at terittiory care hospital.**Objective:**To determine basic demographic characters (age, gender), type of cerebral infraction, regions and arteries involved in cerebral infraction, clinical manifestations, treatment. **Methods**: A total of 140 meningitis patients were collected from hospital recruited since January 2017 – February 2020. Patients were seperated by stroke group and non stroke group by computerised tomography impressions, magnetic resonance imaging impressions. The patients were selected based on inclusion criteria. **Results**: 50 (35.7%) patients were excluded from the study as their CT scan impressions were normal without any cerebral infractions;90 (64.2%) patients were included in this study.cerebral infracts are common in age groups ranging from 20-40 and 40-60. Acute infracts (55%) are more common in meningitis patients. Middle cerebral artery, posterior cerebral arteries are one of the most common arteries affected in meningitis patients. Major regions which are affected are basal ganglia, thalamus and hypothalamus. **Conclusion:**Our study showed that cerebral infractions are seen in 90 patents (64.2%) mostly in basal ganglia region. Only 47 patients (52.2%) were treated for cerebral infractions in the brain. 10 patients (11.1%) were having minor infracts. Rest of 36.6% patients are not provided with proper medication to control cerebral infractions. The lack of stroke awareness often results in the delay of seeking proffessional care.

Keywords: Meningitis, Cerebral Infractions, Computed Tomography, Magnetic Resonace Imaging.

I. INTRODUCTION:

Meningitis is the inflammation of meninges caused by bacterial, viral and funal organisms. Meningitis is one of the most devasting disease and remains a major public health challenge [1]. It has been reported that risk of cerebral infractions is related to infectious diseases such as meningitis [2]. Stroke is one of the second leading causes of death world-wide [3]. Though the mechanism is unknown, most of the cerebral infractions are found in meningitis patients. Tubercular meningitis is one of the major type to cause cerebral infractions in brain. Through computed tomography impressions and magnetic resonance imaging we can identify the infracts in meningitis patients.

The main aim of our study is to identify the cerebral infractions in meningitis patients. The secondary objective of our study is to evaluate basic demographic characters (age, gender), type of infracts in meningitits patients, type of arteries involved in infraction, regions that are mostly affected, to examine the clinical manifestations, present treatment and comorbidities.

II. MATERIALS & METHODS:

Study site:
The study was conducted in teritiory care hospitals, Guntur district.

Study design:
This is a retrospective cohort study on meningitis patients with cerebral infractions. The case profiles of patients were collected from January 2017 – February 2020.

Study period:
The study was conducted for a period of 6 months.

Study criteria:
Inclusion criteria:

- Patients who are diagnosed as meningitis
- Population who were 15 years or older

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- Availability of MRI & CT scan impressions.

Exclusion criteria:

- Population who were below 15 years.
- The pregnancy patients, lactating mothers
- Patients who are not diagnosed as meningitis
- Absence / missed CT & MRI scan reports.

Sample size:

A total of 140 pateints were included in the studiy in which they were diagnosed as meningitis.

Study methods:

Study starts with collection of patient data as per the inclusion criteria such as basic demographic details (age, gender), computerised tomography (CT) impressions, and magnetic resonance imaging (MRI) scan impressions, clinical manifestations, past medical history, personal history, lab data and present treatment.

Statistics:

Continuous variables were expressed as means and standard deviation. In addition, categorical values were expressed as freqencies and percentages.

III. RESULTS:

A total of 140 patients were admitted in hospital with the diagnosis of meningitis in which 50 (35.7%) patients were excluded from the study as their CT scan impressions were normal without any cerebral infractions, finally 90 (64.2%) patients were included in this study.

Age Distribution:

A total of 90 patients were analysed in a period of 6 months study. Table 1 explains the details of age distribution among meningitis patients with cerebral infractions. It concludes that among 90 patients the ages between 15 - 30 and 30 - 45 are mostly effected.

Table 1: Age distribution in meningitis patients with cerebral infractions

Sno	Age	No.of patients	Percentage (%)
1.	15-30	34	37.7%
2.	30-45	25	27.7%
3.	45-60	15	16.6%
4.	60-75	10	11.1%
5.	75-85	06	6.6%

Mean ± SD - 41.36 ± 19.86

Gender Distribution:

Figure1 explains the details of gender distribution in meningitis patients with cerebral infractions. It concludes that there is a slight difference in exposure among males and females. The percentages are as follows: Males – 43 (47.7%), Females – 47 (52.2%).

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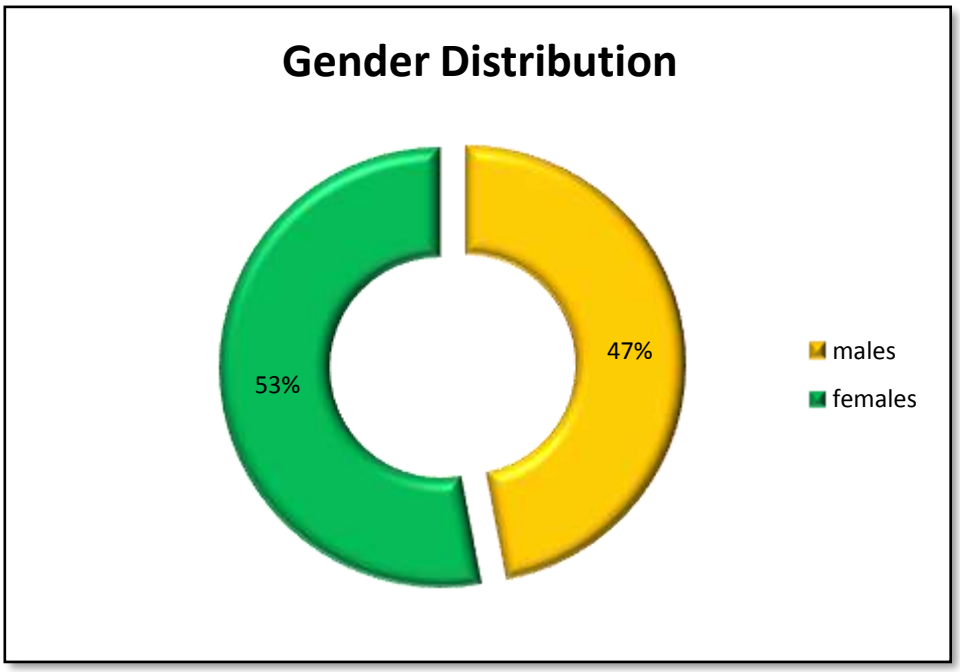

Figure 1: Gender distribution in meningitis patients with cerebral infracts

Cerebral infracts in meningitis patients:

Cerebral infracts are classified based on intensity and location of infract. Table 2 summarizes that patients affected with acute infract – 50 (55%), chronic infract – 20 (22%), lacunar infract (12.2%).

Table 2: Type Of Cerebral Infracts Observed in Meningtis Patients

Sno	Type of infract	No. of patients	Percentage (%)
1.	Acute infract	50	55%
2.	Chronic infract	20	22%
3.	Lacunar infract	11	12.2%

Figure 2 depicts the detailed information of lobes involved in various infracts. Acute infracts and chronic infracts are seen in frontal lobe, parietal lobe, temporal lobe, occipital lobe, capsulo- ganglionic region and caudate nucleus. Lacunar infracts are majorly seen in capsulo ganglionic region and caudate nucleus.

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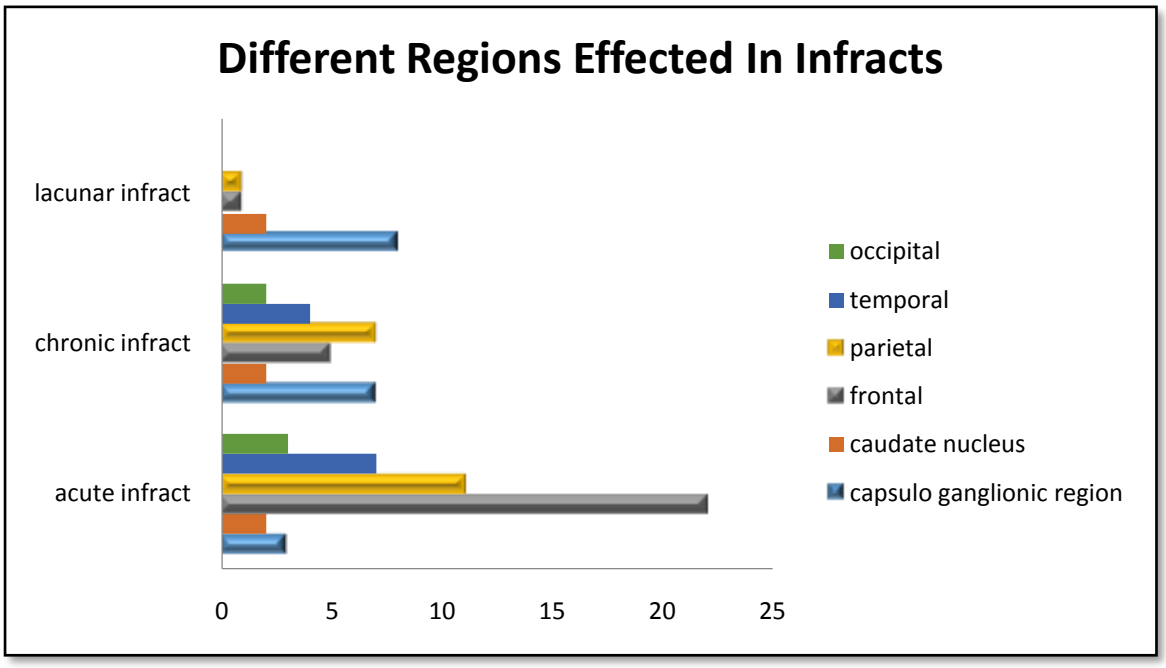

Figure 2: Different Regions Affected in Infracts

Cerebral infractions in arteries:

The main arteries which supply blood to the brain are middle cerebral artery, anterior cerebral artery, inferior cerbral artery and posterior cerebral artery. Figure 3 depicts the reults of infracts in respective arteries:

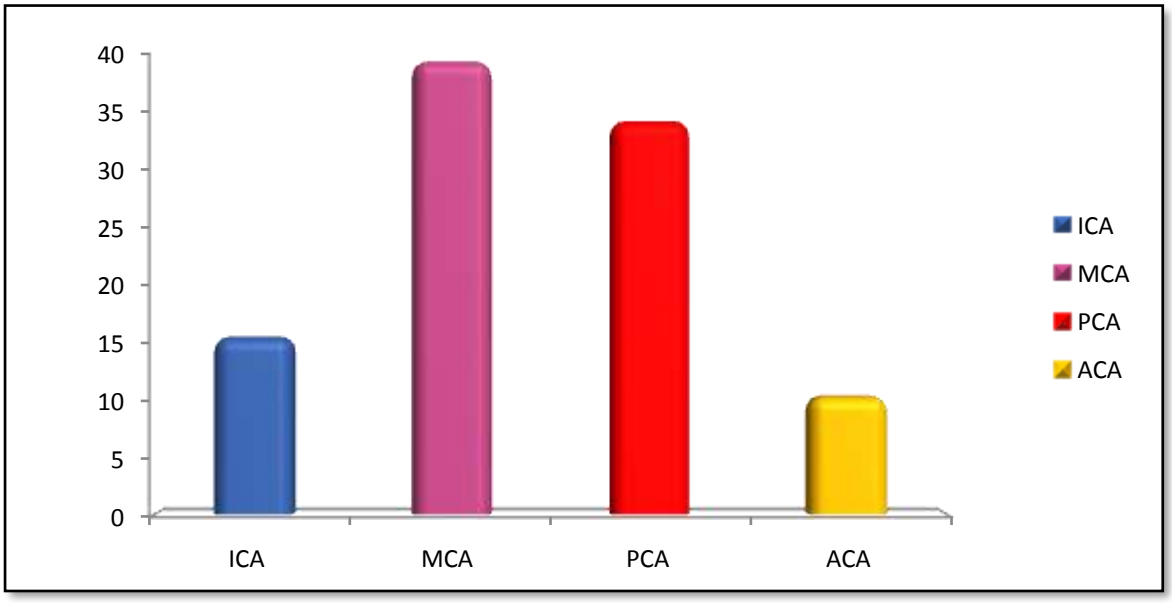

Figure 3: Cerebral Infracts in Arteries

Middle cerebral artery (MCA) is the most effected artery in which it has several braches such as M1, M2 segments which supplies blood to medial and lateral lenticulostriate arieries, prefrontal arteries thereby organs such as caudate

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nucleus, genu, internal capsule, temporal, parietal lobes.

Posterior cerebral artery is the second most affected in which it supplies blood to basilar arteries, vertebral arteries and cerebellum. Anterior cerebellar aretry supplies blood through medial lenticulostriate arteries, callosal arteries to thalamus, corpus callosum, hypothalamus, gyri, caudate nucleus.

Clinical manifestations:

Figure 4 depicts the clinical symptoms observed in meningitis patients with cerebral infractions are as follows: altered sensorium, ataxia, back pain, blurred vision, chicken pox, chills and cough, fever, froathing, giddiness, headache, loss of speech, mouth deviation, seizures, tongue bite, urinary incontinance, vertigo, vomitings, weakenss.

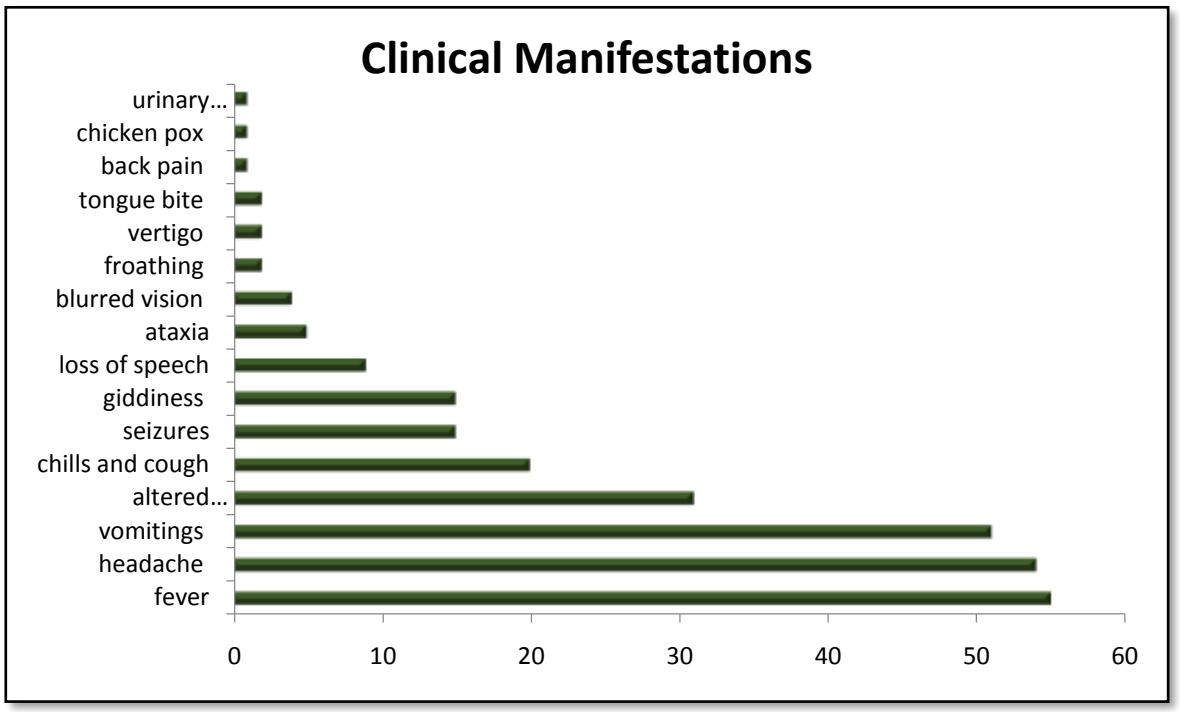

Figure 4: Clinical manifestations

Drug utilization review:

Table 3 depicts the drugs which are prescribed in meningits patients. Mostly drugs such as wide range of antibiotics, anti tubercular agents, corticosteroids, anti convulsants, cognitive enhancers are prescribed. 6 patients are dead, and rest of the patients are administered with the following drugs which are listed as follows:

Table 3: Mostly Prescribed Drugs In Meningitis Patients

Class Of Drug	Drug Name	No.Of Patients Prescribed
Antituberculosis	Ethambutol	62
	Isoniazid	64
	Pyrazinamide	69
	Rifampicin	69

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Corticosteroid	Wysolone	80
	Naproxen Sodium	16
	Deflazocort	7
Anti Convulsants	Levitracetam	38
	Phenobarbitol	7
	Clobazam	13
	Clonazepam	5
	Phenytoin	33
	Acetazolamide	3
Cognitive Enhancers	Cerecetum	9
Antibiotics	Cephalosporins	42
	Meropenum	4
	Vancomycin	4
	Acyclovir	6
	Antifungal	5
	Aminoglycosides	13
	Flouroquinolones	12

Drugs prescribed in meningitis patients with cerebral infractions:

Only 47 patients (52.2%) were treated for cerebral infractions in the brain. 6 patients were subjected to death. Treatments given for cerebral infractions in brain were ecospirin (anitplatelet drug), atorvostatin (statins), and isosorbid dinitrate (vasodialator).

Table 4: Treatment for cerebral infractions

Sno	Class of drug	Name of drug	No. of patients
1.	Antiplatelet	Ecospirin	35
2.	Statins	Atorvastatin	18
3.	Vasodialators	Isosorbid dinitrate	9

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Comorbidities:

Figure 5 depicts the information about comorbidities such as hypertension - 27, type 2 diabetes milletus - 32, thyroid - 08, old stroke - 02, pulmonary tuberculosis – 02.

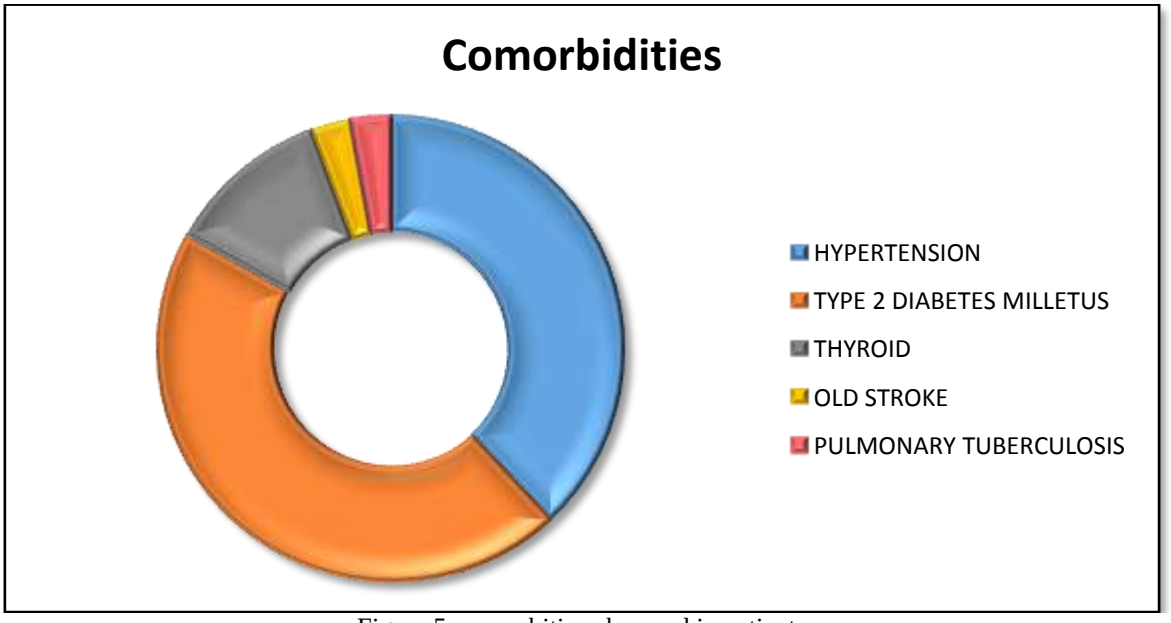

Figure 5: comorbities observed in patients

IV. DISCUSSION:

Stroke is one of the leading causes of death in world-wide. It has been reported that several infectious diseases such as meningitis are leading to stroke. A total of 140 patients were admitted in hospital with the diagnosis of meningitis in which 50 (35.7%) patients were excluded from the study as their CT scan impressions were normal without any cerebral infractions, finally 90 (64.2%) patients were included in this study. Mainly the ages between 15-30 and 30-45 are affected from stroke in meningitis. Males and females are nearly equal to the exposure of stroke in meningitis. The results are as follows: males (47%), females (53%).

Acute infracts (55.5%) are more in patients with meningitis, chronic infracts (22%), lacunar infracts (12.2%). The most common site of exposure is in frontal lobe in which it is full of dopamine sensitive neurons that are responsible for attention, memory, planning, motivation, ataxia, and movements. Infracts are severely seen in middle cerebral artery (39.6%), posterior cerebral artery (34.3%), anterior cerebral artery (10.3%), inferior cerebral artery (15.5%).

Infracts in specific arteries leading to decreased blood supply in basal ganglia, thalamus, hypothalamus, capsulo-ganglionic region, gyri, cerebellum in which leading to impairment of brain functions. Clinical symptoms observed in meningitis patients with cerebral infractions are as follows: altered sensorium, ataxia, back pain, blurred vision, chicken pox, chills and cough, fever, froathing, giddiness, headache, loss of speech, mouth deviation, seizures, tongue bite, urinary incontinance, vertigo, vomitings, weakenss.

In the whole study 6 patients were dead. Rest of the patients are receiving medications such as antibiotics (cephalosporins, meropenum, vancomycin, antiviral, antifungal, macrolide antibiotics, aminoglycosides), anti tubercular agents (isoniazid, rifampIcin, pyrazinamide, ethambutol), corticosteroids (wysolone, deflazocort, naproxen sodium), anti convulsants (phenytoin, levitracetam, clobazam, clonazepam, phenobarbitol) and medications for stroke are antiplatelets (ecospirin), statins (atorvostatin), vasodialators (isosorbid dinitrate).

Role of clinical pharmacist:

A clinical pharmacist should aware the patient about effects of stroke in meningitis patients, medication adherence, counseling about mediaction and a proper healthy diet.

V. CONCLUSION:

Our study showed cerebral infractions are seen in 90 patents (64.2%) mostly in the region of

basal ganglia and middle cerebral artery is one of the most affected in meningitis patients..Only 47 patients (52.2%) were treated for cerebral infractions in the brain. 10 patients (11.1%) were having minor infracts. Rest of 36.6% patients are not provided with proper medication to control cerebral infractions. The lack of stroke awareness often results in the delay of seeking proffessional care.

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