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A PROSPECTIVE OBSERVATIONAL STUDY ON THE PREVALENCE OF URINARY INCONTINENCE IN HOSPITALIZED STROKE PATIENTS IN TERTIARYCARE HOSPITAL

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ABSTRACT

PURPOSE:

The objective of this study is to evaluate the prevalence of urinary incontinencein stroke patients and to calculate the severity of urinary incontinence.

INTRODUCTION:

Urinary incontinence is also called as involuntary micturition (or) leakage ofurine that you can't control. It is most under medical reporting problem that affects the emotional, psychological and social life of the people. It is not
always caused by stroke or underlying medical condition like Parkinson's disease, multiple sclerosis, Alzheimer's disease. It is common in elderly people affecting 1 in 20 people under age of 65 years and 1 in 12 people above 75 yearsof age.

METHODS:

This Study was Conducted in the Neurology department of Lalitha Super Speciality Hospital, Guntur Andhra Pradesh. A 300 bedded multy specialty tertiary care hospitalfor a period of 6 months from 2020-2021.The procedure ofthe study was a prospective observationalstudy was conducted in the hospitalized stroke patients.

Theinclusion criteria for the study are the patients admitted in the hospital of above 18 years, inpatients who are diagnosed with stroke, patients who are willing to participate in study, urinary incontinent patients with past medicalhistory of ischemicstroke.

RESULTS & DISCUSSION:

A sample of 150 patients were enrolled into the study. The data was taken fromthe patient who is admitted in the hospital. In this study the prevalence of urinary incontinence, possible etiologies of urinary incontinence in different types of stroke patients.

Out of 150 patients 107(71.33%) patients were males and 43(28.66%) werefemales. Out of 107 males 42(39.2%) were incontinent on admission and 21(19.6%) were incontinent at the time of discharge. Out of 43 females 21(48.8%) were incontinent on admission and 13(30.2%) were incontinent at these time of discharge. According to our study females are more prone to urinary incontinence than males.

The risk of urinary incontinence raises as the age of patient increases. our study has shown direct proportionality between age and urinary incontinence.There was increased percentage of urinary incontinence in patients with increased age group.

CONCLUSION:

The current study has shown that there is a clear association between stroke andurinary incontinence. Finally, we concluded that the risk of urinary incontinenceis more in females and the patients with recurrent stroke.

Thus, the urinary incontinence should be screened in all stroke centers based onthe revised urinary incontinence scale (RIUS). Patient counselling was providedto patients such as behavioral interventions include timed voiding, prompted voiding, bladder retraining with urge suppression, pelvic floor muscle training, and compensatory rehabilitation approaches.

Key words: Stroke, urinary incontinence, prevalence, student T test, revisedurinary incontinence.

STROKE (CVA):

INTRODUCTION

Stroke is a medical condition in which poor blood flow to the brain results in cell death.Stroke is one of the most common neurological disorders in clinical practice. [1] According to WHO, it is the

second commonest cause of death worldwide. It is forecasted that the deaths because the of stroke will rise to 6.5 million by 2015 and by 2020, stroke and coronary artery disease are expected to be the leading causes of losing life. Earlier Surveys on stroke in different parts of India shown that the prevalence of stroke varies in different regions of India and ranges from 40 to 270 per 1,00,000 populations. Stroke is responsible for around 11% of all deaths worldwide.

TYPES OF STROKE:

- There are two main types of stroke:

  a) Ischemic stroke

b) Hemorrhagic stroke

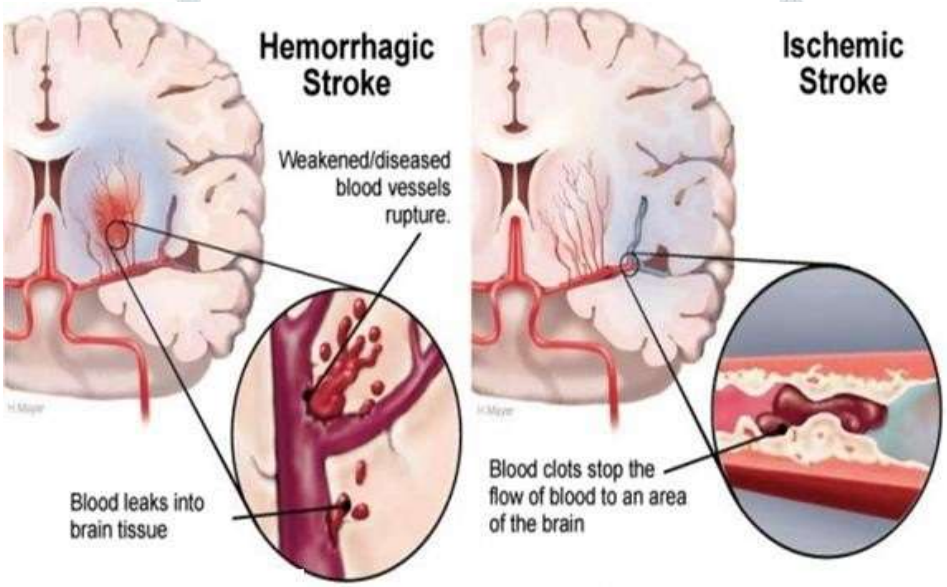


Fig:1 Types of Stroke

Ischemic Stroke:

The majority of strokes occur when blood vessels to the brain become narrowed or clogged with fatty deposits called plaque. This cuts off blood flow to brain cells. A stroke caused by lack of blood reaching part of the brain is called an ischemic stroke. Most ischemic strokes occur between the ages of 71 and 80 years.

- There are two types of ischemic stroke they are:

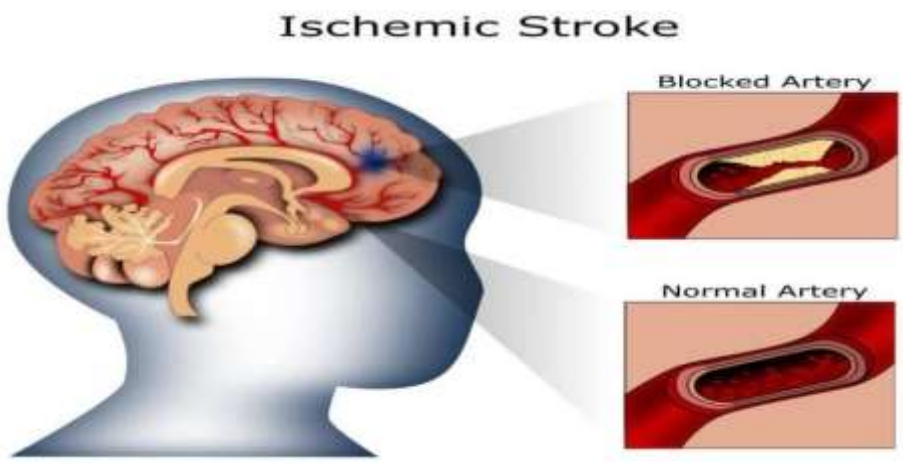


FIG 2: ISCHEMIC STROKE

Thrombotic Stroke:

It is caused by a blood clot (thrombus) in an artery going to the brain. The clot blocks blood flow to part of the brain. Blood clots usually form in arteries damaged by plaque.

Embolic Stroke:

It caused by a wandering clot (embolus) that's formed elsewhere (usually in the heart or neck arteries). Clots are carried in the bloodstream and block a blood vessel in or leading to the brain.

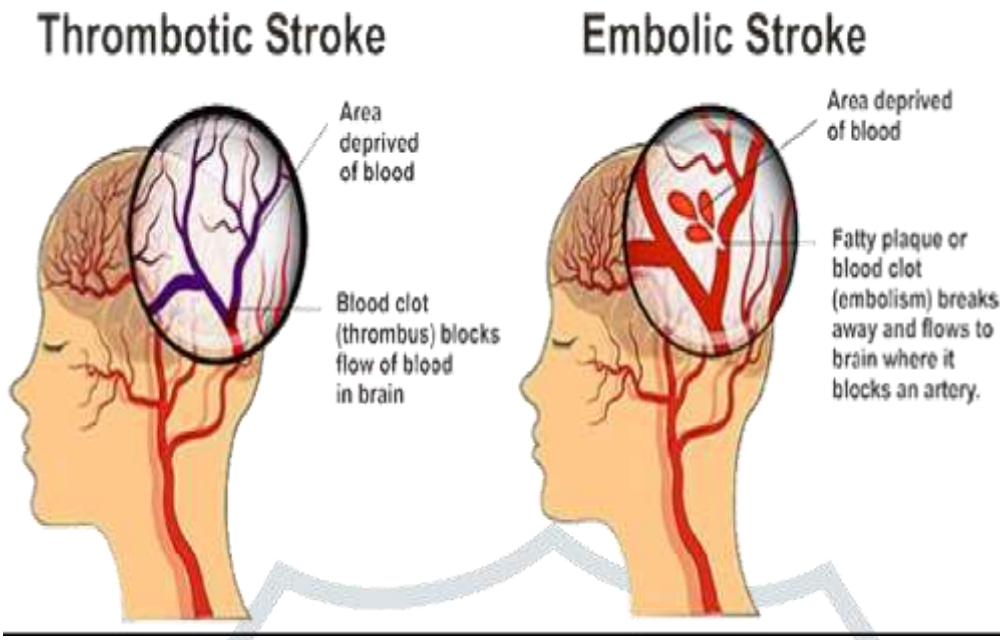
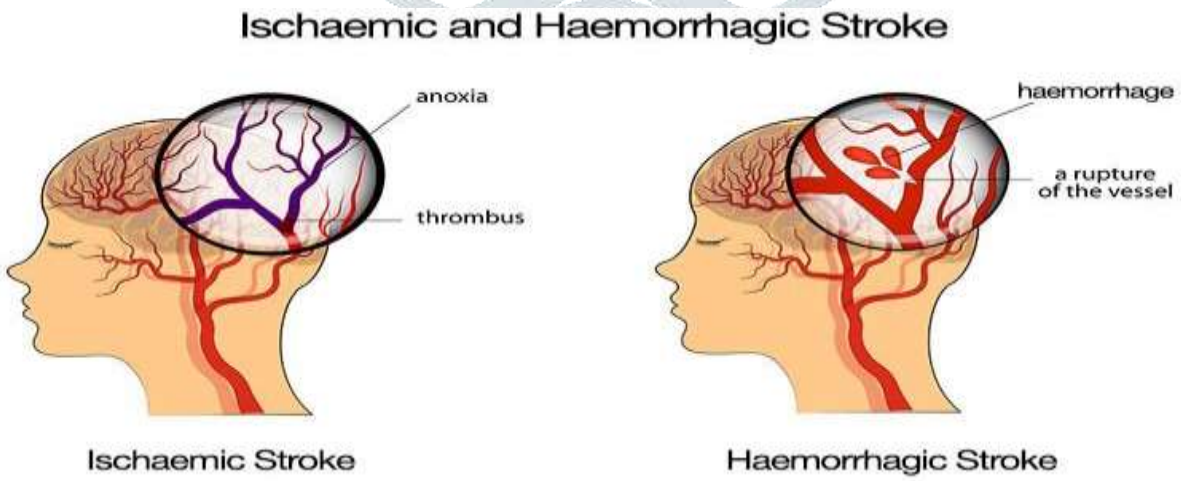


FIG 3: THROMBOTIC AND EMBOLIC STROKE

Hemorrhagic Stroke:

It is caused by burst or leaking blood vessels in brain.Whilemost hemorrhagic strokes occur between 60 and 70 years of age. Defining stroke types helps in determining the most effective therapy and is clearly related to prognosis. Stroke occurs predominantly in middle and late years of life.



- **There are two types of hemorrhagic strokes**:

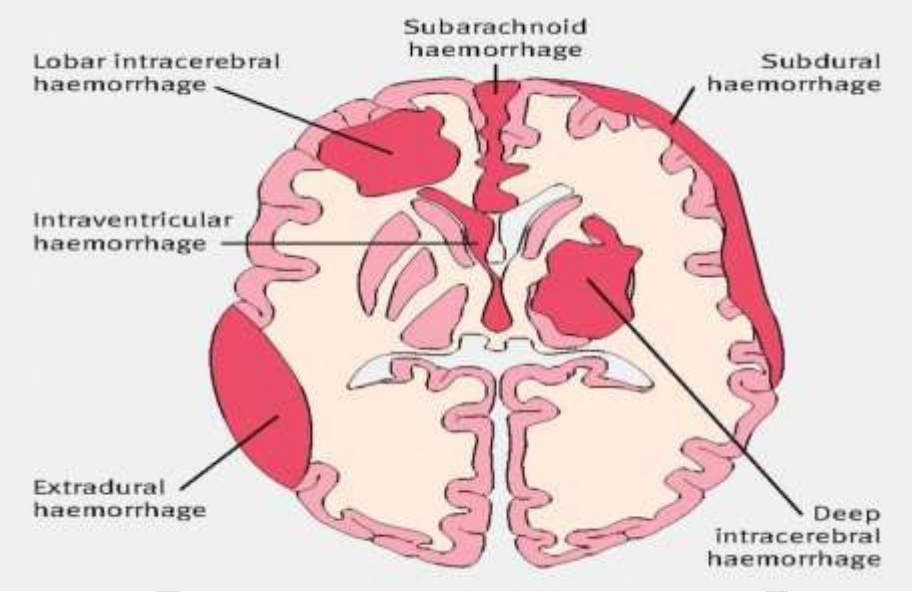


FIG 5: TYPES OF HAEMMORRHAGES

Intracerebral Hemorrhage (ICH):

It is the most common type of hemorrhagic stroke. It occurs when an arteryin the brain bursts, flooding the surrounding tissue with blood.

Subarachnoid Hemorrhage (SAH):

It is a less common type of hemorrhagic stroke. It refers to bleeding in the area between thebrain and the thin tissues that cover it.

Pathophysiology of stroke:

A stroke occurs when the blood flow to an area of the brain is interrupted, resulting in some degree of permanent neurological damage. The two major categories of stroke are ischaemic (lack of blood and hence oxygen to an area of the brain) and haemorrhagic (bleeding from aburst or leaking blood vessel in the brain) stroke.

Pathophysiology of ischemic stroke

The common pathway of ischaemic stroke is lack of sufficient blood flow to perfuse cerebraltissue, due to narrowed or blocked arteries leading to or within the brain.

Ischaemic strokes can be broadly subdivided into thrombotic and embolic strokes.

Narrowing is commonly the result of atherosclerosis – the occurrence of fatty plaques liningthe blood vessels. As the plaques grow in size, the blood vessel becomes narrowed and the blood flow to the area beyond is reduced.

Damaged areas of an atherosclerotic plaque can cause a blood clot to form, which blocks theblood vessel – a thrombotic stroke.

In an embolic stroke, blood clots or debris from elsewhere in the body, typically the heartvalves, travel through the circulatory system and block narrower blood vessels.

Based on the aetiology of ischaemic stroke, a more accurate sub-classification is generallyused:

- Large artery disease – atherosclerosis of large vessels, including the internal carotidartery, vertebral artery, basilar artery, and other major branches of the Circle of Willis.
- Small vessel disease – changes due to chronic disease, such as diabetes, hypertension,hyper lipidemia, and smoking that lead decreased compliance of the arterial walls and/or narrowing and occlusion of the lumen of smaller vessels.
- Embolic stroke – the most common cause of an embolic stroke is atrial fibrillation.
- Stroke of determined etiology – such as inherited diseases, metabolic disorders, and coagulopathies.
- Stroke of undetermined etiology – after exclusion of all of the above.

In the core area of a stroke, blood flow is so drastically reduced that cells usually cannotrecover and subsequently undergo cellular death.

The tissue in the region bordering the infarct core, known as the ischaemic penumbra, is less severely affected. This region is rendered functionally silent by reduced blood flow but remains metabolically active. Cells in this area are endangered but not yet irreversibly damaged. They may undergo apoptosis after several hours or days but if blood flow and oxygen delivery is restored shortly after the onset of stroke, they are potentially recoverable

The ischemic cascade

After seconds to minutes of cerebral ischaemia, the ischaemic cascade is initiated. This is a series of biochemical reactions in the brain and other aerobic tissues, which usually goes on for two to three hours, but can last for days, even after normal blood flow returns.

The goal of acute stroke therapy is to normalise perfusion and intervene in the cascade of biochemical dysfunction to salvage the penumbra as much and as early as possible.

Although it is called a cascade, events are not always linear.

The ischaemic cascade:

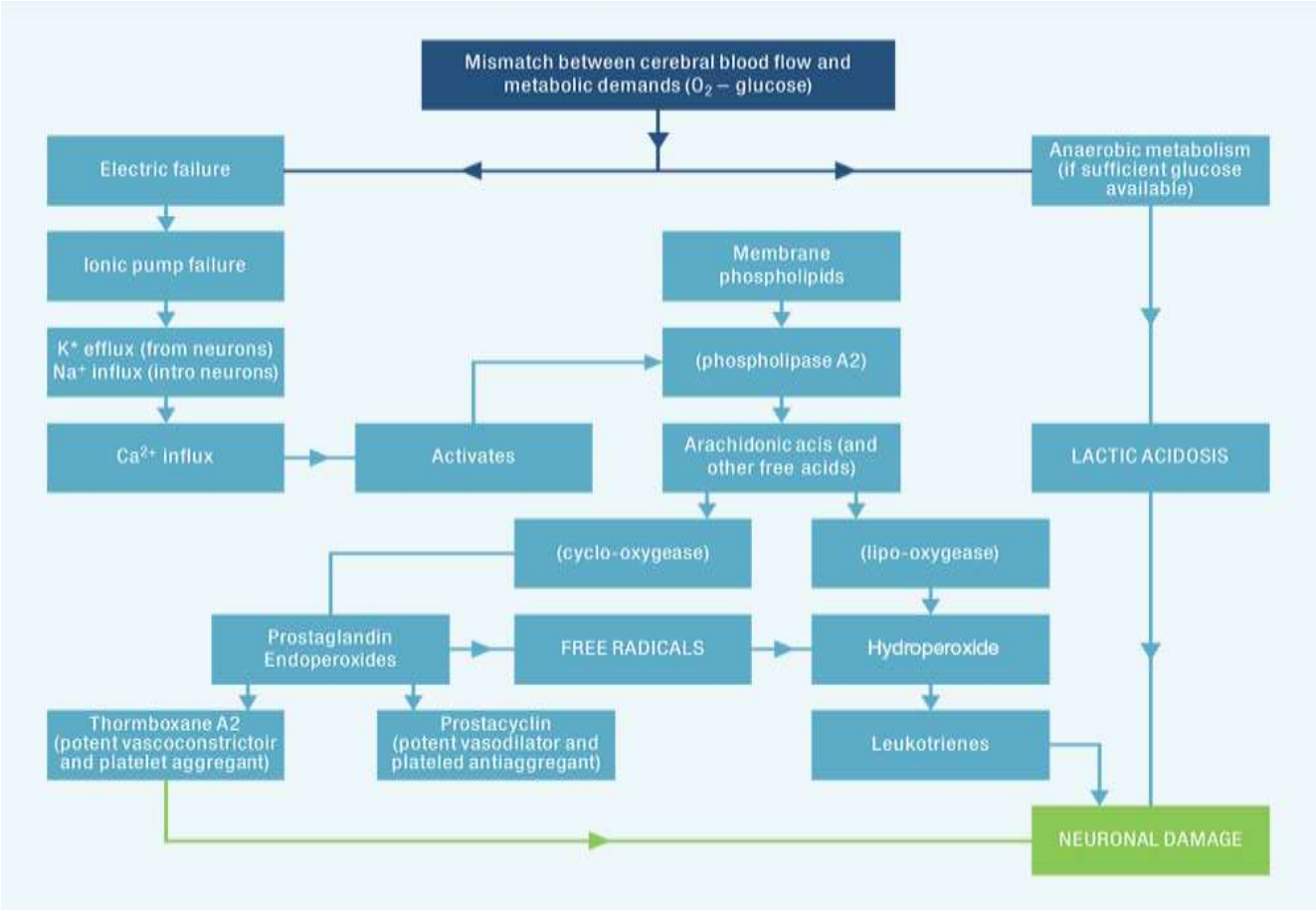


Fig 6: ISCHEMIC CASCADE

Important steps of the ischaemic cascade

1. Without adequate blood supply and thus lack of oxygen, brain cells lose their ability to produce energy - particularly adenosine triphosphate (ATP).
2. Cells in the affected area switch to anaerobic metabolism, which leads to a lesser production of ATP but releases a by-product called lactic acid.
3. Lactic acid is an irritant, which has the potential to destroy cells by disruption of thenormal acid-base balance in the brain.
4. ATP-reliant ion transport pumps fail, causing the cell membrane to become depolarized; leading to a large influx of ions, including calcium (Ca^{++}), and an effluxof potassium.
5. Intracellular calcium levels become too high and trigger the release of the excitatoryamino acid neurotransmitter glutamate.
6. Glutamate stimulates AMPA receptors and Ca^{++}-permeable NMDA receptors, whichleads to even more calcium influx into cells.
7. Excess calcium entry overexcites cells and activates proteases (enzymes which digest cell proteins), lipases (enzymes which digest cell membranes) and free radicals formed as a result of the ischemic cascade in a process called excitotoxicity.
8. As the cell's membrane is broken down by phospholipases, it becomes more permeable, and more ions and harmful chemicals enter the cell.
9. Mitochondria break down, releasing toxins and apoptotic factors into the cell.
10. Cells experience apoptosis.
11. If the cell dies through necrosis, it releases glutamate and toxic chemicals into the environment around it. Toxins poison nearby neurons, and glutamate can overexcitethem.
12. The loss of vascular structural integrity results in a breakdown of the protective bloodbrain barrier and contributes to cerebral edema, which can cause secondary progression of the

brain injury.

Pathophysiology of haemorrhagic stroke

Haemorrhagic strokes are due to the rupture of a blood vessels leading to compression of brain tissue from an expanding haematoma. This can distort and injure tissue. In addition, thepressure may lead to a loss of blood supply to affected tissue with resulting infarction, and

the blood released by brain haemorrhage appears to have direct toxic effects on brain tissue and vasculature.

- **Intracerebral haemorrhage** – caused by rupture of a blood vessel and accumulation of blood within the brain. This is commonly the result of blood vessel damage from chronic hypertension, vascular malformations, or the use medications associated with increased bleeding rates, such as anticoagulants, thrombolytics, and antiplatelet agents.

- **Subarachnoid hemorrhage** is the gradual collection of blood in the subarachnoid space of the brain dura, typically caused by trauma to the head or rupture of a cerebralaneurysm.

SIGNS AND SYMPTOMS:

Signs and symptoms often appear soon after the stroke has occurred. If symptoms last less than one or two hours it is known as a transient ischemic attack (TIA) or mini-stroke.

Numerous neurological, social and psycho emotional sequelae of CVA are documented in themedical and psychological literature. The most well known and thought of consequence of CVA is motor disturbance with unilateral weakness (hemiplegia) or paralysis (hemiparesis). These deficits are frequently co morbid with in coordination, poor motor planning, loss of balance, ataxia and abnormal posture. In addition, survivors of stroke may experience altered level of consciousness, somatosensory deficits, disorders of vision, severe pain and unilateral neglect. The effects of aphasia (disorder of language), dysarthria (impairment of articulation), and dysphagia (disruption of

swallowing) may interact with one another and greatly diminish both expressive and receptive communicative ability to express needs or psychological states Social and Psycho emotional Complications. In addition to the impact of residual

physiological deficits on the survivor's ability to maintain physical intimacy, there are broader implications for both the quality and level of their involvement.

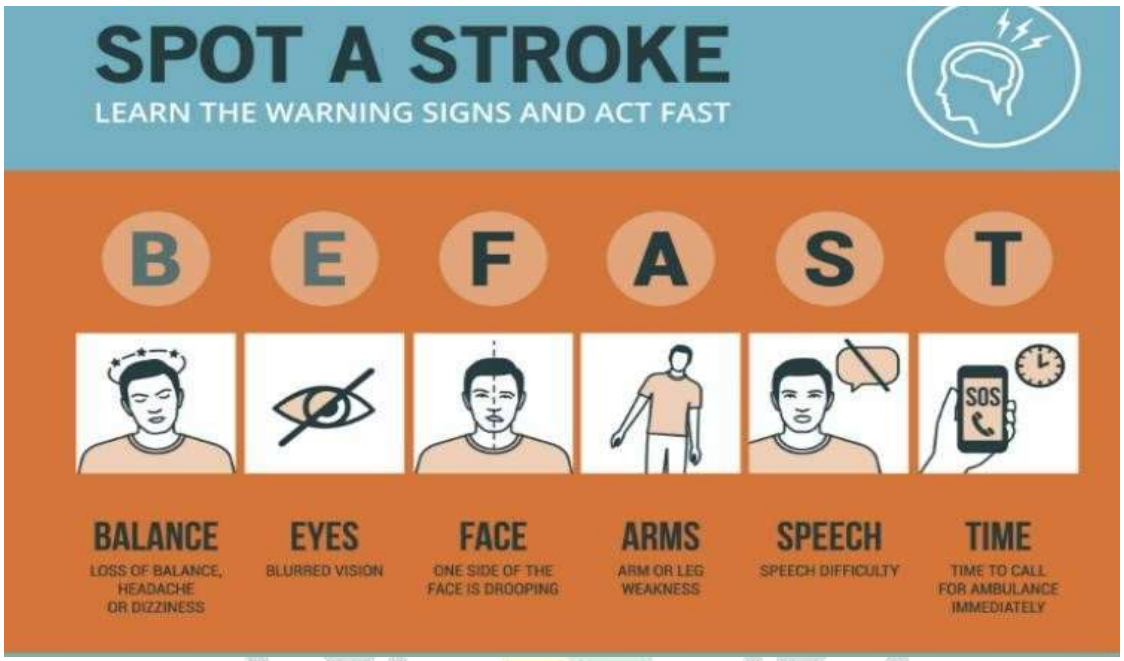


FIG 7: STROKE SYMPTOMS

RISK FACTORS:

The established modified risk factors for stroke include Hypertension (HTN), high lipid profile, Diabetes mellitus (DM), heart disease and smoking. These risk factors can be prevented either through active, healthier life style choices or by medications. Appropriate knowledge and awareness of perceived risk factors and warning signs would facilitate early interventions aimed to reduce these modifiable risk factors and immediate hospitalization for effective stroke treatment and prevention.

URINARY INCONTINENCE (UI):

Urinary Incontinence [UI] is also called involuntary urination (or) leakage of urine that you can't control. It is most under reporting medical problem that affects the emotional, psychological and social life of the people. It is not always caused by stroke, underline medical condition like Parkinson's disease, multiple sclerosis, alzhemeirs disease etc.., may also responsible in causing urinary incontinence.

It is common in elderly people affecting 1 in 20 people under age of 65 years and 1 in 12 people above 75 years of age.

Several studies reported that 6% of community population affected with severe incontinence.11 to 38% of women is incontinent over age of 65 years.

Several studies show that 32 to 79% of patients of stroke patients were incontinent onadmission.

It is reduced to 25 to 28% on discharge.12-19% of patients were incontinent after several months of stroke patients.

There is difference in morbidity and mortality of patients between the patients with premorbid incontinent and incontinent after stroke.

Normal Bladder Function:

Urinary bladder contains a smooth muscle called detrusor muscle. This muscle relaxation leads to storing of urine in bladder and contraction of this muscle leads to voiding of urine. Itsaction must be coordinated with urethral sphincter. Sympathetic nervous system relaxes detrusor muscle. It leads to bladder filling. Internal urethral sphincter is tonically active because of sympathetic action on alpha receptors.

If bladder is filled, sensory nerves sends signals to sacral spinal cord. It strengthen sympathetic stimuli to internal urethral sphincter and stimulate contraction of external urethral sphincter through

pudendal nerve. Filled bladder also inhibit parasympathetic activity which is responsible for contraction of detrusor muscle. These action maintain continence.

If bladder fullness reaches a critical level, sensory pelvic nerves sends signal to pontine micturition centre in brain stem. It inhibits sympathetic nervous system and activate parasympathetic system. This actions cause contraction of detrusor muscle and relaxationof external urethral sphincter leads to voiding of urine.

Pontine micturition centre is under control of pre frontal cortex and other frontal lobe structures such as bilateral medial frontal micturitoncentre. Frontal lobe inhibits pontinemicturition centre results in maintenance of continence when not desired to void urine.

If bladder stretches than its stretching limit, urine passes out irrespective of frontal lobe stimulus to protect the tissue damage of bladder.

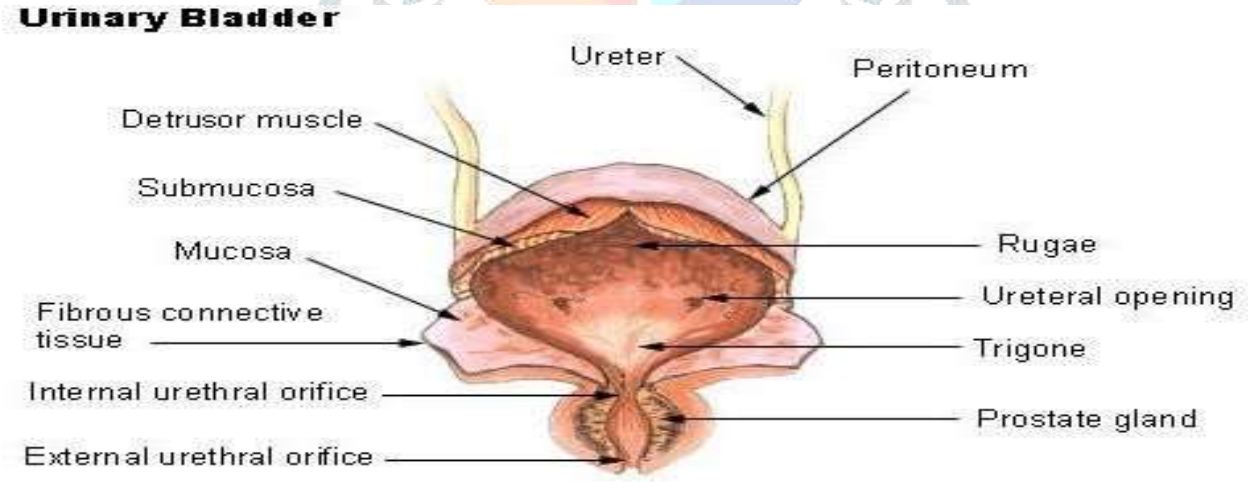


FIG 8: URINARY BLADDER

TYPES OF URINARY INCONTINENCE:

Stress incontinence:

Stress incontinence is leakage of urine with respective of physical activities like jumping, coughing,

sneezing laughing etc.,these physical exertions that increases abdominal pressure also puts pressure on the bladder. Only a small amount of urine leaks out. The pressure of full bladder overcomes the body's ability to hold in urine. The leakage occurs even though the bladder muscles are not contracting and loss of urgency in urination.

Stress incontinence occurs due to weakness or damage of the urethral sphincter, the pelvic Floormuscles or both these structures and cannot dependably hold in urine.

Stress incontinence is divided into two subtypes.

1) Due to the urethral hyper mobility the bladder and urethra shift downwards and there is nosupport for urethra to keep closed.

2) Due to intrinsic sphincter deficiency, urinary sphincters can't be closed fully leads toleakage of urine.

Overactive bladder (urge incontinence):

It's a strong feeling of urgency to urinate even though bladder is not full sometimes called urge incontinence. This condition occurs in both men and women. There is loss of urine before reaching to bathroom. It affects the social and work life of individuals. It is caused by detrusor over activity.African American women with incontinence are more likely to report symptoms of overactive bladder than stress incontinence.

Neurological diseases such as multiple sclerosis, parkinsonism, cerebro vascular attack, brain trauma can cause over active bladder. It can also caused by non neurological causes such as

BPH (beningn prostatic hypertrophy) in men, urinary tract infection, renal caliculi,prostatecancer surgery. Elderly people and post menopausal women also develop the urge urinary incontinence. Direct damage to the nueromicturition pathways due to lesion of stroke(particularly frontal lobe) causes detrusor muscle to contract without cortical inhibition this leads to urge urinary incontinence(UUI).

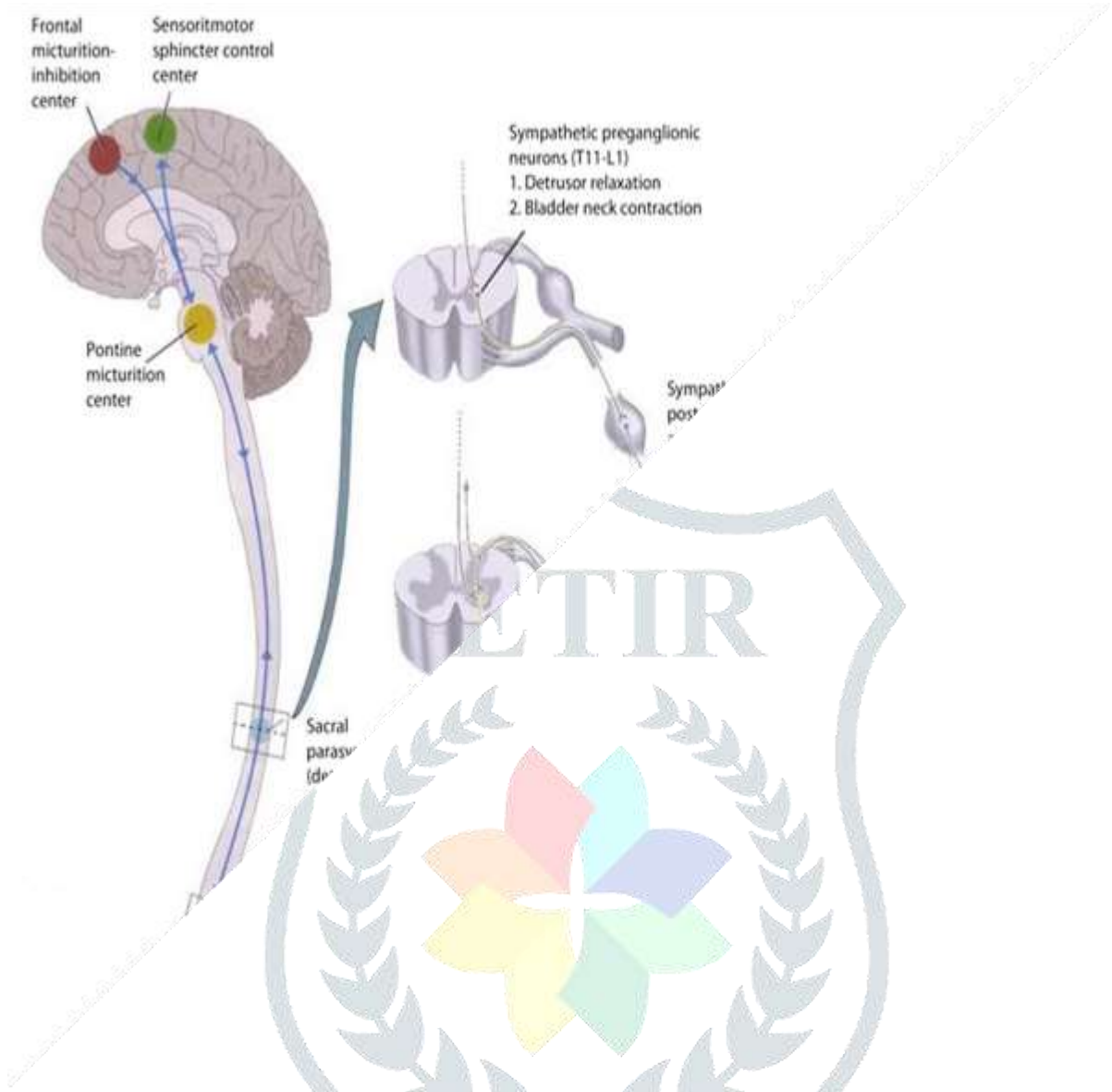


FIG 9: PHYSIOLOGY OF VOIDING OF URINE

Mixed incontinence:

Mixed incontinence is the condition that is having symptoms of both urge and stress incontinence. It is common type of incontinence in women. It is caused in men who had undergone surgery of prostate enlargement.

Overflow incontinence:

Overflow incontinence is also known underactive bladder. It is caused by detrusor hyporeflexia It occurs in both men and women but men are more affected than women because it often caused by

prostate related conditions. In this incontinence there is no feeling(unawareness) of urgency even though the bladder is filled. This leads to leakage of urine. It can caused by nerve damage condition such as diabetes, multiple sclerosis, shingles, post surgery, child births. This condition is sometimes related to diabetes or cardiovascular disease.

Functional incontinence:

In the functional incontinence urine leaks out due to physical or mental disabilities but not due to improper functioning of urinary tract. Physical disabilities such as being hospitalized, cerebro vascular attack (CVA), arthritis etc.., mental disabilities such as dementia, alzheimers disease etc. Some of the medications also cause functional incontinence such as diuretics. If you make most of your urine at night, the result might be nocturnal incontinence, or bedwetting. In CVA, impaired cognition and aphasia, motor abnormalities cause the functional incontinence.

Reflex incontinence

In this type of incontinence urine leaks out without any signs or urge. It is caused nerve damage that sends sensory information to brain. This incontinence is common in people with multiple sclerosis, spinal cord injuries, and surgical damage. This condition is occur inpatients with anterior circulation stroke with parietal and subcortical involvement but not with damage to frontal lobe.

Predictors and risk factors of UI:

motor weakness, cognitive impairment, stroke related motor and sensory weakness(especially lower extremities) risk factors of urinary incontinence.Poststroke, female sex,older age are the predictors of UI. Patients with UI are more prone to infections than pt without UI

Mortality and morbidity:

Several studies shown that patients with Urinary incontinence has high risk of UTI, falls,poor quality of life, slower recovery and prolonged hospitalization

METHODOLOGY

Study design:

This was a prospective, observational and cross sectional randomized study on prevalence of urinary incontinence in stroke patients. This study was conducted in neurology ward in a tertiary care hospital of Guntur.

Study site:

The study was carried out in LALITHA SUPER SPEACIALITY HOSPITAL tertiary of Guntur.

Study Period:

We conducted a study in a period of 6 months.

Study Population & Sampling:

A total of 150 subjects were enrolled the study who were diagnosed with ischemic stroke. Hemorrhagic stroke patients were not included in study based on exclusion criteria. Out of 150 subjects 107 patients were males and 43 were females. No subject was dropped out of study because this study includes in patients only.

Study Criteria:

Inclusion criteria:

1. In patients who were diagnosed with ischemic stroke
2. Patients with age above 18 years
3. Patients who are willing to participate in study

4. Patients who were diagnosed with recurrent ischemic stroke
5. Urinary incontinent patients with past medical history of ischemic stroke.

Exclusion criteria:

1. patients with age below 18years
2. Heart failure patients
3. patients with kidney problems and kidney failure
4. patients with prostate hypertrophy
5. patients using diuretics

Study Tools:

Patient's data were collected from the past medical records of the patients and in patients' medical records in hospital. A self-administered questionnaire was prepared to choose patient for study and RUIS scale was used to assess the urinary incontinence and severity of urinary incontinence in patients.

1. What is your age?

The intention of the question is to know whether the patient is eligible to studyaccording to age criteria or not.

2. Do you any heart related problems such as heart failure?

The intention of the question is to eliminate the heart failure patients from study

3. Do you have any kidney related problems?

The intention of the question is to eliminate kidney failure patients from study

4. Do you have any prostate related problem?

The intention of the question is to eliminate prostate disease patients from study

5. Do you have any problem with urination?

The intention of the question is to eliminate the patients with previous history ofurinary incontinence.

6. Are you using any diuretics?

The purpose of this question is to eliminate patients who are using diuretic

7. Are you suffering with Diabetes?

The intention of this question is to know the whether patient having diabetes or not.

RUIS scale:

RUIS scale is a revised urinary incontinence scale used to measure the severity of urinary incontinence. It also used for therapeutic indication of urinary incontinence. It is a short, reliable scale for evaluation of urinary incontinence. The cronbach's scale for RUIS was 0.70.

1. Urine leakage relate to the feeling of urgency	not at all (0) Slightly (+1) Moderately (+2) Greatly (+3)
2. Urine leakage related to physical activity,Coughing or sneezing	not at all (0) Slightly (+1) Moderately (+2) Greatly (+3)
3. Small amount of urine leakage	not at all (0) Slightly (+1) Moderately (+2) Greatly (+3)
4. How often do you experience urine leakage?	Less than once a month (+1)A few times a month (+2) A few times a week (+3) Every day and/or night (+4)
5. How much urine do you lose each time?	None (0) Drops (+1) Small splashes (+2) More (+3)

The interpretation of the scale includes

- ✓ Patients who have score between 2 to 3 were not urinary incontinent
- ✓ Patients who have score between 4 to 8 were mild urinary incontinent
- ✓ Patients who have score between 9 to 12 were moderately urinary incontinent
- ✓ Patients who have score more than 12 were severe urinary incontinent.

Interviewers:

- The interviews were carried out by the students of the project members by telephone communication and through direct interview.
- The interviewers were familiarized with the questionnaire and trained in the proper manner of questioning as well as being familiarized with the operational definitions in order to maintain the uniformity of interpretation and explanationfor the benefit of the illiterate and non-English speaking respondents.
- It was stressed that the interviewers write the responses as stated by the respondents and not their own interpretation of what was stated.
- The interviewers were also trained not to show bias or emotion during the interview. Non-respondents were not replaced for the purpose of the survey brief introduction about the purpose and nature of the study and assurance about confidentiality were explained to the respondents prior to the interview.
- The interview for each respondent lasted 10 to 15 minutes on average. The interviewers were trained on scoring of RUIS score of the individual patient and to interpret the score of the RUIS scale.

Data analysis:

The responses in the recording form were manually checked for errors on admission. Standardized codes were used to simplify the coding process and analysis. Data were analyzed using PRISM software Version 11.0. Data analysis was done based on the objectives of the study. Data screening was done to determine associations or correlations between variables. Student T test was used to calculate P value. A p value less than 0.05 was considered to be statistically significant.

Minimizing errors:

1. The interviewers were familiarized with the questionnaire and adequately trained tocomplete the required responses to minimize interviewer bias.

2. A weekly assessment of completed questionnaires was carried out by a single coordinator and feedback provided to the interviewers.

3. Regular supervision of interviewers was carried out during the course of data collection.

4. Accuracy of data entry was assessed by a 10 % reassessment of data entry andcrosschecks with the hard copy of the data.

Ethical issues:

1. The participants were briefed regarding the nature, objectives and method of study andtheir voluntary participation acquired.

2. Participants were reserved the right to withdraw from the study at any point of time.

3. Total confidentiality with regard to the identification of the participants and information volunteered was assured at all times during and after survey.

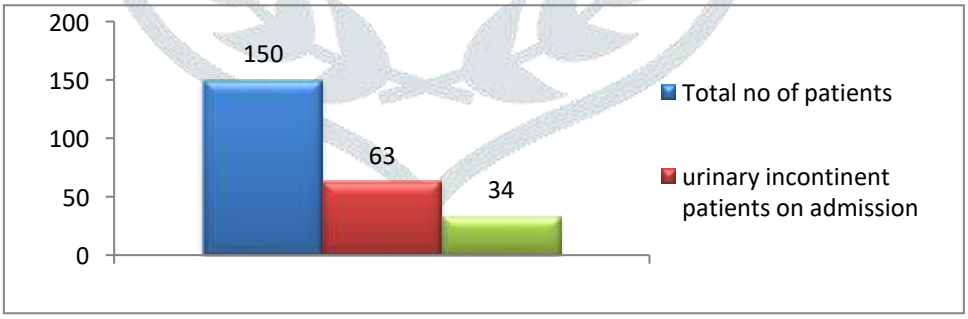
RESULTS & DISCUSSION

To the best of our knowledge, this is our first study to evaluate the prevalence of the urinary incontinence associated with stroke in LALITHA SUPER SPECIALTY HOSPITAL GUNTUR. The results were obtained for a period of 6 months duration studyin the neurology department of tertiary care hospital. A total of 150 patients were enrolled in the study & the data was analyzed.

Prevalence of urinary incontinence in total patients

CATEGORY	TOTAL	PERCENTAGE
No. of patients with UI on admission	**63**	**42%**
No. of patients with UI on discharge	**34**	**22.6%**

Table 1: Distribution of patients based on admission and discharge



Graph 1: No. of pts having urinary incontinence on admission,discharge

A total of 150 patients were enrolled in the study according to the inclusion and exclusioncriteria of study.

Out of 150 patients 42% (63 patients) of patients were urinary incontinent at the time of admission.

Among 63 patients 27 patients have mild urinary incontinence, 17 patients have moderateurinary incontinence and 19 patients have severe urinary incontinence.

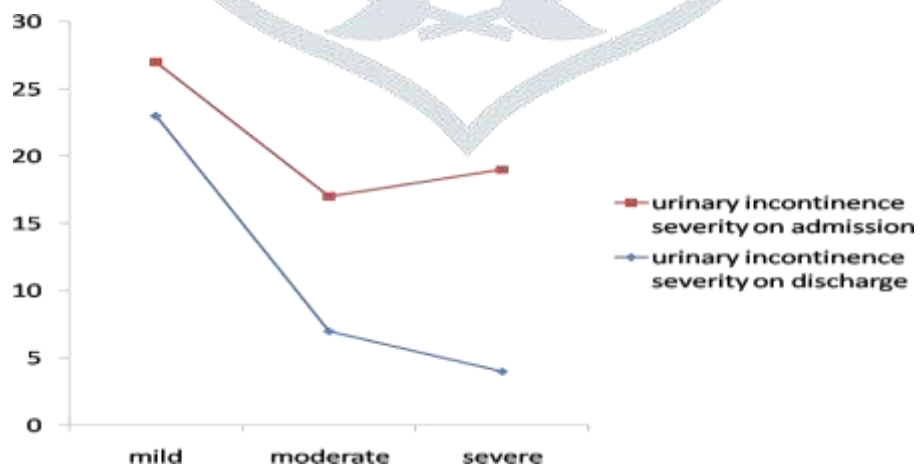
Out of 34 patients were urinary incontinent at time of discharge that is equal to 22.6% of patients. Out of 34 patients 23 patients have mild urinary incontinence, 7 patients have moderate urinary incontinence and 4 patients have severe urinary incontinence.

The severity of urinary incontinence was measured using RUIS scale.

This data suggest that there is decreased prevalence and severity of urinary incontinence at the time of discharge.

TYPE OF INCONTINENCE	PATIENTS WITH UI ON ADMISSION	PATIENTS WITH UI ON DISCHARGE
MILD	27	23
MODERATE	17	7
SEVERE	19	4

Table 2: Distribution of patients based on mild, moderate and severeurinary incontinence

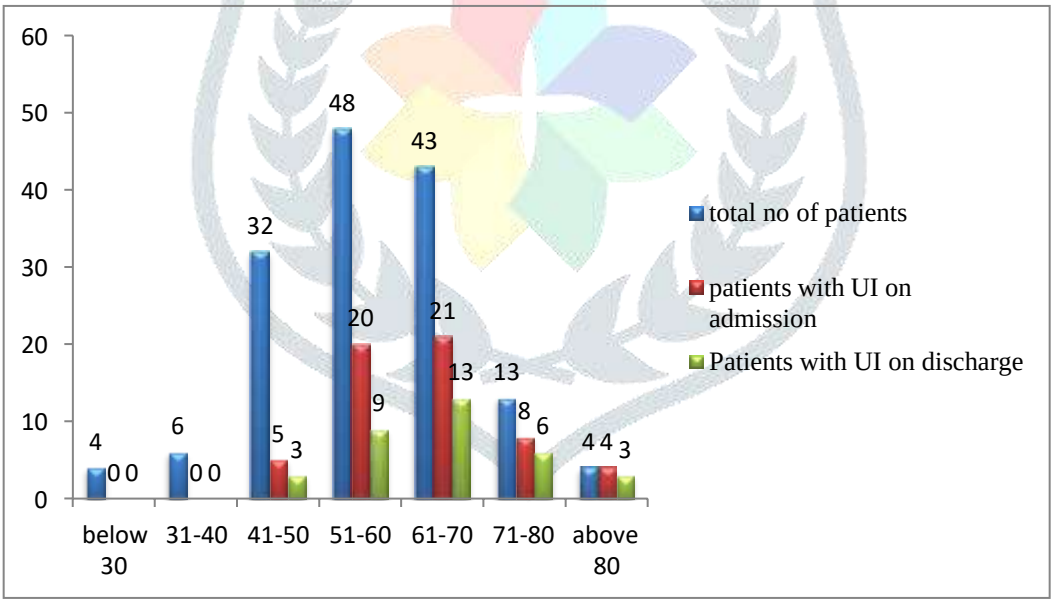


Graph 2: No. of patients having mild, moderate and severe urinary incontinence

Prevalence of urinary incontinence on basis of age:

AGE	BELOW 30	31-40	41-50	51-60	61-70	71-80	ABOVE 80
TOTAL NOOF PATIENTS	04	06	32	48	43	13	04
PATIENTS WITH UI ON ADMISSION	00	00	05	20	21	08	04
PATIENTS WITH UI ON DISCHARGE	00	00	03	09	13	06	03

Table 3: No .of patient's having urinary incontinence according to age



Graph 3: Percentage of patients with urinary incontinence with respect to age group at time of admission and discharge

Among 150 patients 4 peoples were belongs to age group (below 30), out of 4 no one is presented with urinary incontinence during both admission and discharge, 06 patients were belongs to age group (31-40), out of 06 patients no one presented with urinary incontinence during both admission and discharge, 32 patients were belongs to the age

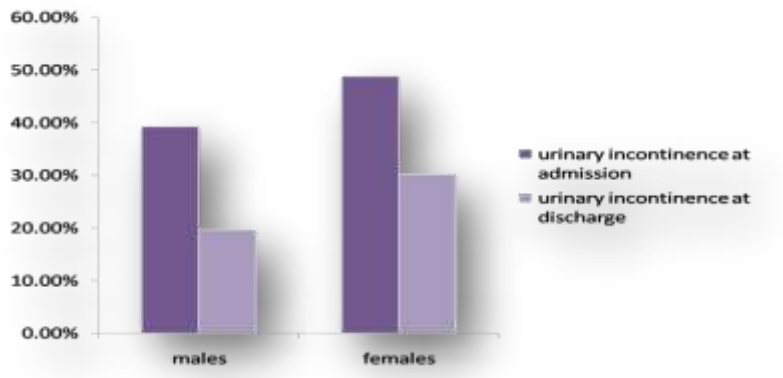
group (41-50), out of 32 patients 5 patients were presented with UI during admission and 03 patients are presented with UI during discharge,48 patients were belongs to age group (51-60), out of 48 patients 20 patients were presented with IU during admission and 09 patients were patients presented with UI during discharge, 43 patients were belongs to age group of (61-70), out of 43 patients 21 were presented with UI during admission and 13 were presented with UI during discharge, 13 patients were belongs to age group (71-80), out of 13 patients 08 patients were presented with UI during admission and 06 patients were patients presented with UI during discharge, 04 patients were belongs to age group (above 80), out of 04 patients 04 patients were presented with UI during admission and 03 patients were patients presented with UI during discharge.

Based on above demographic data the risk of urinary incontinence rises as the age of patient increases. Our study had shown direct proportionality between age and urinary incontinence. There was increased percentage of urinary incontinence patients with increased age group. The results were analyzed using paired T test and proven to be significant with p value 0.03.

Prevalence of urinary incontinence on basis of gender:

	UI ON ADMISSION	UI ON DISCHARGE
MALES (107) 71.33%	42 (39.2%)	21(19.6%)
FEMALES (43) 39.2%	21 (48.8%)	13(30.2%)

Table 4: Percentage of urinary incontinence in male and female patients

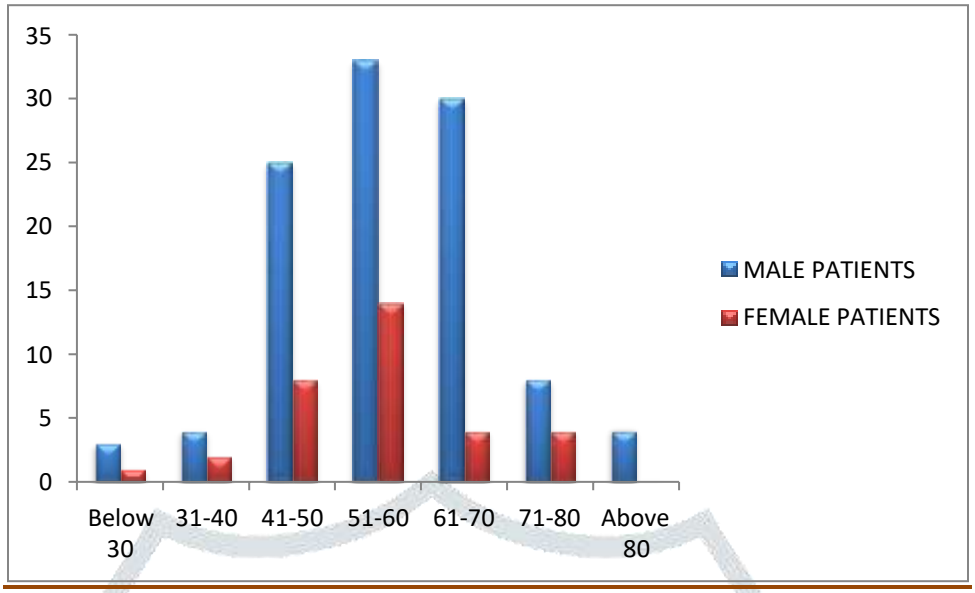


Graph 4: Percentage of urinary incontinence in male and female patients

Out of 150 patients 107(71.33%) patients were males and 43(28.66%) were females. Out of 107 males 42(39.2%) were incontinent on admission and 21(19.6%) were incontinent at time of discharge. Out of 43 females 21(48.8%) were incontinent on admission and 13(30.2%) were incontinent at time of discharge. According to our study females aremore prone to urinary incontinence than males.

Table 5: Population of Males and Females According To Age Group

GENDER	Below 30	31-40	41-50	51-60	61-70	71-80	Above 80
MALE PATIENTS	3	4	25	33	30	8	04
FEMALE PATIENTS	1	2	8	14	4	04	0

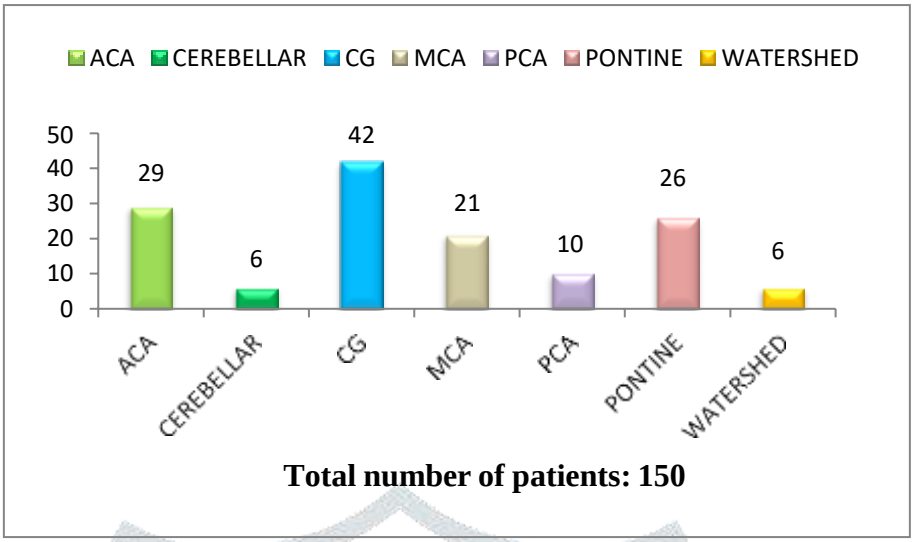


Graph 5: Population of males and females according to age group

Prevalence of urinary incontinence on basis of location of infarct:

TYPE OF INFARCT	NO.OF PATIENTS
ACA	29
CEREBELLAR	6
CG	42
MCA	*21*
PCA	10
PONTINE	26
WATERSHED	6

Table 6: Distribution of patients based on location of infarct



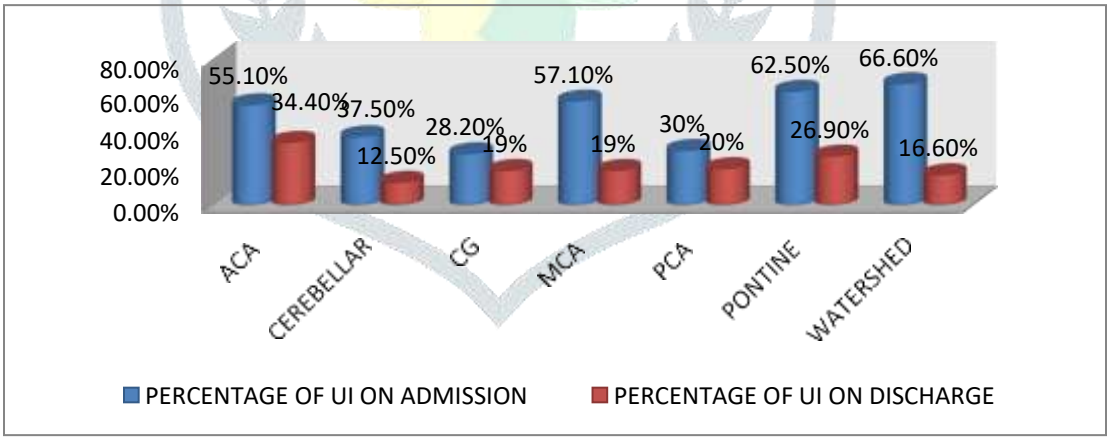
Graph 6: Distributionof patients based on location of infarct

Patients were separated based on the location of infarct. 29 were ACA(anterior cerebral artery) infarct patients, 16 were cerebellar infarct patients, 42 were CG(capsule ganglion) infarct patients, 21 were MCA(mid cerebral artery) patients, 10 were PCA(posterior cerebral artery) patients, 26 were pontine infarct patients, 6 were watershed infarct patients.

Out of 29 ACA infarct patients 16(55.1%) patients were incontinent on admission and 10(34.4%) patients were incontinent on discharge. Out of 16 cerebellar infarct patients 6(37.5%)patients were incontinent on admission and 2(12.5%) were incontinent on discharge. out of 42 CG infarct patients, 12(28.2%) patients were incontinent on admission and 8(19%) were incontinent on discharge. out of 21 MCA infarct patients 12(57.1%) patients were incontinent on admission and 4(19%) were incontinent on discharge. Out of 10 PCA patients 3(30%) were incontinent on admission and 2(20%) were incontinent on discharge. out of 26 pontine infarct patients 10(62.5%) patients were incontinent on admission and 7(26.9%) were incontinent on discharge. Out of 6 watershed infarcts 4(66.6%) patients were incontinent on admission and 1(16.6%) on discharge.

TYPE OF INFRACT	Patients with UI during admission	Patients with UI during Discharge
ACA (29)	16(55.1%)	10(34.4%)
CEREBELLAR (16)	6(37.5%)	2(12.5%)
CG (42)	12(28.2%)	8(19%)
MCA (21)	12(57.1%)	4(19%)
PCA (10)	3(30%)	2(20%)
PONTINE (26)	10(62.5%)	7(26.9%)
WATERSHED	4(66.6%)	1(16.6%)

Table 7: No. of patients having urinary incontinence on admission and on discharge



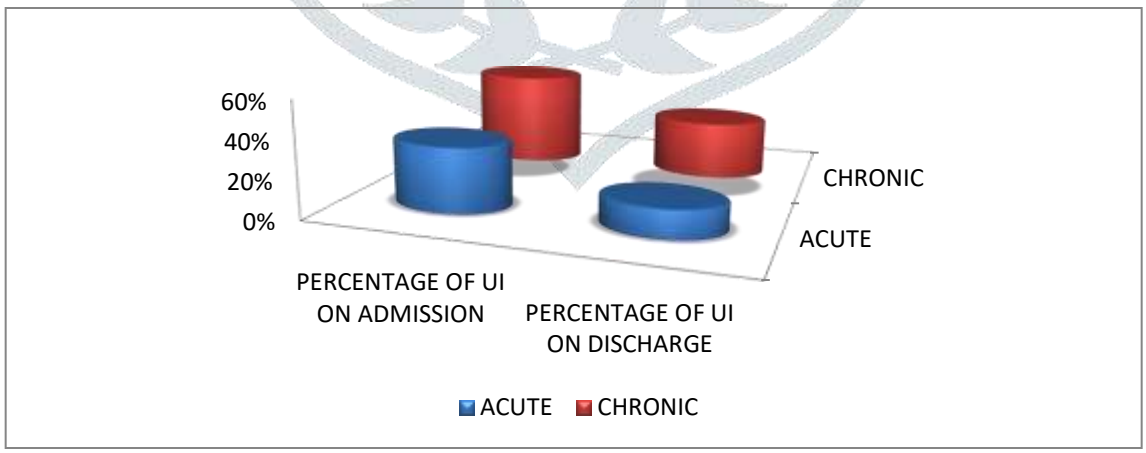
Several studies were done to investigate the relationship between urinary incontinence and location of infract. Patients who had ACA infarct are more prone to urinary incontinence because ACA infarct may cause lesion in micturition centers of frontal cortex, leads to urinary incontinence.

Watershed infarcts have higher percentage of patients with urinary incontinence this is due to larger infarcts are also a reason for causing urinary incontinence. Pontine infarcts directly related detrusor sphincter dyssynergia and detrusor hyper reflexia causing urinaryincontinence. MCA infarcts may leads to motor weakness of limbs and may also cause aphasia this leads to urinary incontinence.

Prevalence of urinary incontinence on basis of acute/chronic infarct:

TYPE OF INFARCT	PERCENTAGE OF UI ON ADMISSION	PERCENTAGE OF UI ON DISCHARGE
ACUTE	34%	14.7%
CHRONIC	50%	30.6%

Table 8: Percentage of patients having urinary incontinence on admission and on discharge



Graph 8: percentage of patients having urinary incontinence on admission and discharge

Out of 150 patients 88(58.66%) patients were having acute infarct. Out of 88 acute infarct stroke patients 30(34%) patients have urinary incontinence on admission and 13 patients (14.7%) have urinary incontinence on discharge.

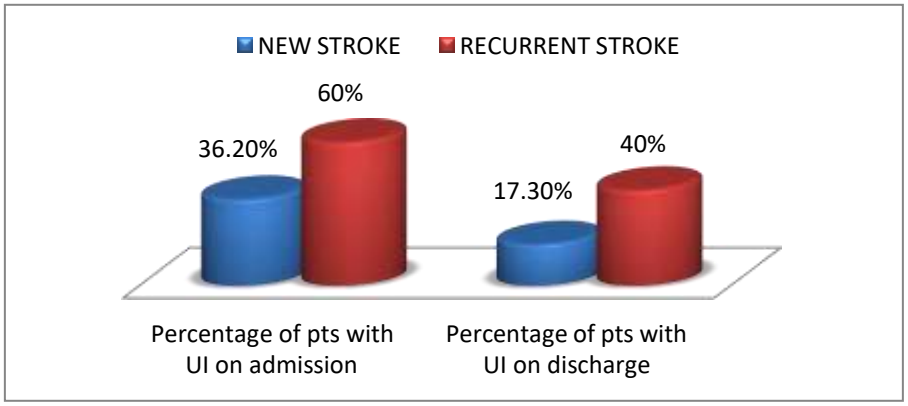
Out of 150 patient's 62 patients have chronic infarct (41.33%), Out of 62 patient's 31(50%) patients have urinary incontinence on admission and 19(30.6%) patients have urinary incontinence on discharge.

This study shown that there is increased urinary incontinence in chronic infarct patients than Acute infarct patients.

Prevalence of urinary incontinence on basis of New/Recurrent stroke Patients:

Type of stroke	Percentage of pts with UI on admission	Percentage of pts with UI on discharge
NEW STROKE	36.2%	17.3%
RECURRENT STROKE	60%	40%

Table 9: Percentage of pts having urinary incontinence on basis of new /recurrent stroke



Graph 9: Percentage of patients having urinary incontinence on admission and discharge in relation to New and Recurrent stroke

Out of 150 patients 115 patients are new stroke patients. Out of 115 new stroke patients 42(36.2%) patients had urinary incontinence on admission and 20(17.3%) patients had Urinary incontinence on discharge.

Out of 150 patients, 35 patients had recurrent stroke. Out of 35 patients 21(60%) patients had urinary incontinence on admission and 14(40%) patients had urinary incontinence on discharge. Recurrent stroke patients have high risk of urinary incontinence.

CONCLUSION

Our study had clearly shown that there is clear association between stroke and urinary incontinence. It states that there is direct proportionality between age and urinary incontinence, as the age of the patient increases, the risk of the Urinary continence increases.

And we concluded that the risk of urinary incontinence is more in females when compared to males. The patients with recurrent stroke have high risk of incidence of urinary incontinence thannew stroke.

This study shown that there is increased urinary incontinence in chronic infarct patients than acute infarct patients and study supports recurrent stroke had has high risk of incidence of urinary incontinence than new stroke.

Thus the urinary incontinence should be screened in all stroke centers based on the revised urinary incontinence scale (RIUS) to prevent the risk of urinary incontinence. Patient counseling was provided to patients such as behavioral interventions include timed voiding, prompted voiding, bladder retraining with urge suppression, pelvic floor muscle training, compensatory rehabilitation approaches.

Finally newer strategies to educate healthcare professionals and public about impact of stroke on urinary incontinence and optimal therapy to improve patient quality of life are necessary.

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