American Journal of Biology and Natural Sciences
https://biojournals.us/index.php/AJBNS
ISSN: 2997-7185

Diagnosis of Early Stroke by Ct Scan

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Received: 2024, 15, Sep
Accepted: 2024, 21, Sep
Published: 2024, 06, Oct

Annotation: In this matter, we use CT in emergency cases, and the patient often arrives unconscious, and in this case the doctor cannot give a final clinical diagnosis, so we perform a CT scan. This provides us with a device to see the damaged blood vessels and their location. Therefore, we diagnose the condition and know the type of stroke (ischemic-hemorrhage). The specialist follows up the condition of the patient suffering from a stroke using an MRI scan.

Occipital bleeding represents the most dangerous (destructive) type, as the rate of recovery from it is very low, and in most cases the person suffering from this type loses his life. The infection rate is 15%.

As for its perfusion, it is less dangerous compared to the first, and the patient can be cured, and it is the most common, with a rate of 85%.

Introduction

WHAT IS CT SCAN?

A Computed Tomography (CT) scanner is an x-ray machine which combines many x-ray images with the aid of a computer to generate cross-sectional views and, if needed, three-dimensional images of the internal organs and structures of the body. They help physicians diagnose a range of conditions by producing images of internal organs and structures of the body. This indicator is measured in the numbers of equipment per 1 000 000 inhabitants. It is presented as a total and broken down between hospitals (primarily inpatient facilities) and ambulatory care providers (primarily outpatient facilities).(1)

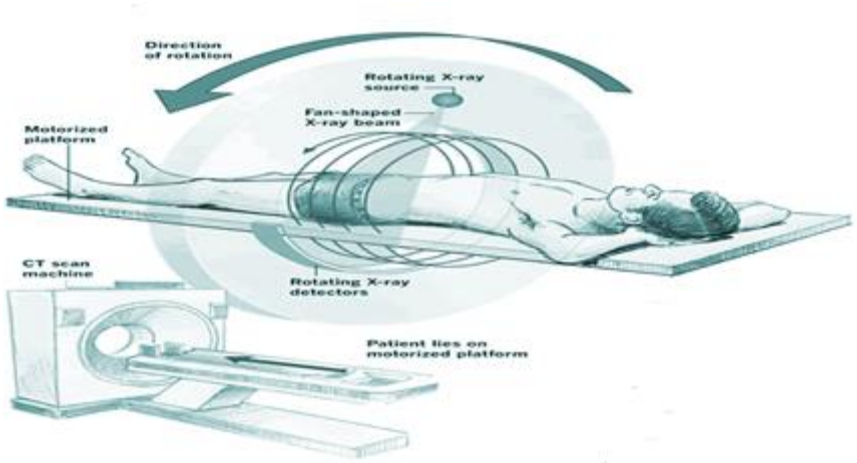
FIGER 1: CT MACHINE

HOW DOES CT WORK?

Computed tomography (CT) also relies on x-rays transmitted through the body. It differs from conventional radiography in that a more sensitive x-ray detection system is used, the images consist of sections (slices) through the body, and the data are manipulated by a computer. The x-ray tube and detectors rotate around the patient .The outstanding feature of CT is that very small differences in x-ray absorption values can be visualized. Compared with conventional radiography, the range of densities recorded is increased approximately ten-fold. Not only can fat be distinguished from other soft tissues, but also gradations of density within soft tissues can be recognized, e.g. brain substance from cerebrospinal fluid, or tumour from surrounding normal tissues.

The patient lies with the body part to be examined within the gantry housing the x-ray tube and detectors. Although other planes are sometimes practicable, axial sections are by far the most frequent. The operator selects the level and thickness to be imaged: the usual thickness is between 1.25 and 2mm (often viewed by aggregating adjacent sections so they become 5mm thick). The patient is moved past an array of detectors within the machine. In effect, the data at multiple adjacent levels are collected continuously, during which time the x-ray beam traces a spiral path to create a 'volume of data' within the computer memory. Multidetector (multislice) CT acquires multiple slices (64, 128, 256 or 320 depending on the machine) during one rotation of the x-ray tube. Multidetector CT enables the examination to be per formed in a few seconds, thereby enabling hundreds of thin sections to be obtained in one breath-hold. A relatively new development is dual source (or dual energy) CT. This tech nique allows a virtual non-contrast CT image to be derived

from CT acquired with intravenous iodinated contrast medium (see later in chapter) allowing a reduction in radia tion dose in certain CT protocols.The data obtained from the multislice CT exposures are reconstructed into an image by computer manipulation.The computer calculates the attenuation (absorption) value of each picture element (pixel). Each pixel is 0.25-0.6 mm in diameter, depending on the resolution of the machine, with a height corresponding to the chosen section thick. ness. The resulting images are displayed on a monitor and can be stored electronically. The attenuation values are expressed on an arbitrary scale (Hounsfield units) with water density being zero, air density being minus 1000 units and bone density being plus 1000 units The range and level of densities to be displayed can be selected by controls on the computer. The range of densities visualized on a particular image is known as the window width and the mean level as the window level or window centre. CT is usually performed in the axial plane, but because attenuation values for every pixel are present in the computer memory it is possible to reconstruct excellent images in other planes, e.g. coronal sagittal or oblique, and even three-dimensional (3D) images. (2)



FGER 2: CT WORK

WHAT ARE THE REASONS FOR A CT SCAN OF THE BRAIN?

A CT of the brain may be performed to assess the brain for tumors and other lesions, injuries, intracranial bleeding, structural anomalies (e.g., hydrocephalus, infections, brain function or other conditions), particularly when another type of examination (e.g., X-rays or a physical exam) are inconclusive .A brain CT may also be used to evaluate the effects of treatment on brain tumors and to detect clots in the brain that may be responsible for strokes. Another use of brain CT is to provide guidance for brain surgery or biopsies of brain tissue .There may be other reasons for your doctor to recommend a CT of the brain. .(3)

Risk of CT Scan

The amount of radiation used during a CT scan is considered minimal; therefore, the risk for radiation exposure is low.

If you are pregnant or suspect that you may be pregnant, you should notify your physician.

Radiation exposure during pregnancy may lead to birth defects.

If contrast dye is used, there is a risk for allergic reaction to the dye. Patients who are allergic to or sensitive to medications, contrast dye, iodine, or shellfish should notify their physician.

Patients with kidney failure or other kidney problems should notify their physician. In some cases, the contrast dye can cause kidney failure, especially if the person is taking Glucophage (a diabetic medication).

There may be other risks depending upon your specific medical condition. Be sure to discuss any concerns with your physician prior to the procedure.

Certain factors or conditions may interfere with the accuracy of a CT scan of the chest. These factors include, but are not limited to, the following:

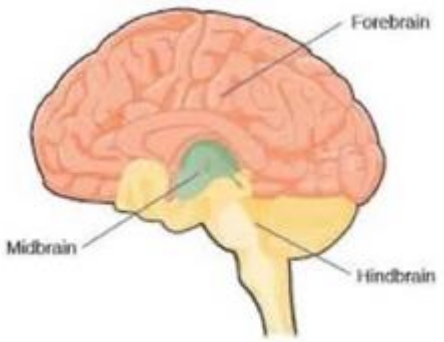
Metallic objects within the chest, such as surgical clips or a pacemaker

Body piercings on the chest Barium in the esophagus from a recent barium study.**(4)**

Brain anatomy:

The Brain:

is semisolid structure which conform the shape of the skull. Brain consists of cerebrum, cerebellum and brain system.



The main parts of the brain are:

1.Forebrain : which include the cerebrum and

diencephalons which includes thalamus and

hypothalamus ((stress responses, blood pressure

control, temperature regulation)).

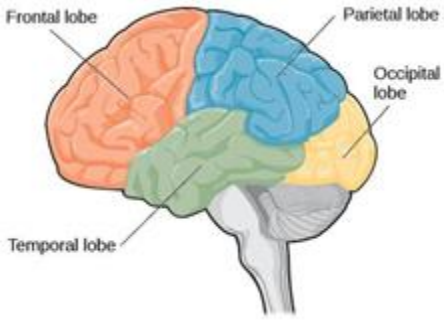
2.Midbrain: is narrow and connecting the forebrain to

the hind brain.

3.Hindbrain: which include cerebellum, pons and

medulla oblongata which connecting the brain to spinal cord.

The cerebrum is the largest brain part. It consists of two hemispheres which are connected bymass of white matter called (corpus callusum).The surface layer of each hemisphere called (cortex).



Each cerebral hemisphere divided into 4 lobes: frontal , parietal, occipital and temporal lobes.

Brain cavities (ventricles): The brain ventricles are:

1.Lateral ventricle which are right and left lateral ventricales

2.Third ventricle

3.Fourth ventricle(5)

WHATE IS THE STROKE:

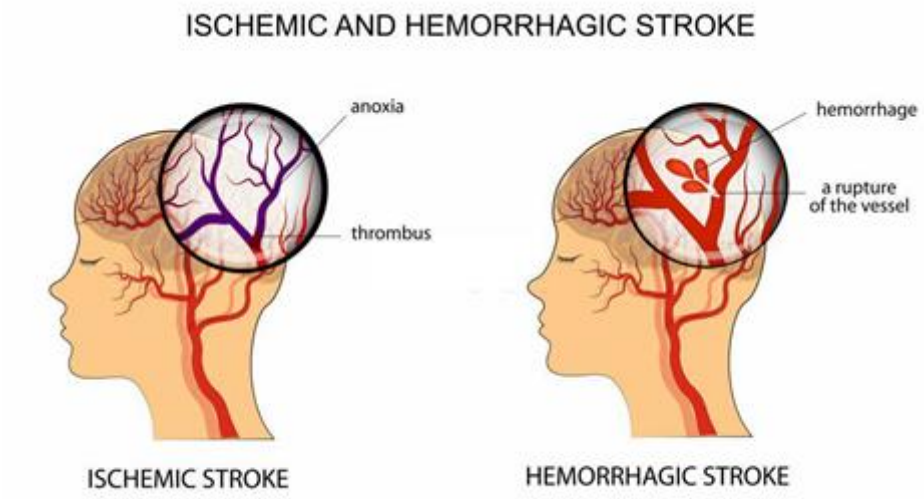
Cerebrovascular accident (CVA) is the medical term for a stroke**:**

Stroke is defined as a sudden, focal neurological deteriora-fion due to a disturbance in the blood supply to the brain.

Iris a common cause of hospital admission and has a high morbidity. The important causes of stroke are:

- Cerebral infarction(ischemic), which may be due to in situ thrombus or embolus from the proximal artery or heart.
- Intracerebral haemorrhage.
- Subarachnoid haemorrhage.

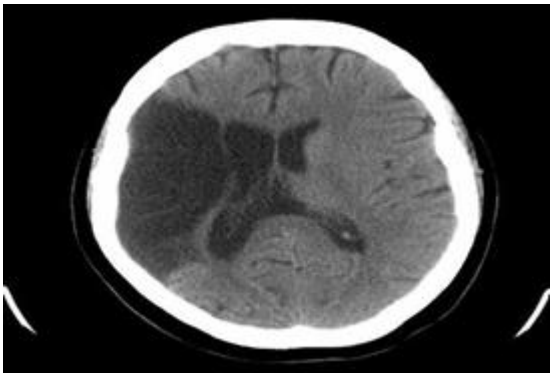
Acute cerebral infarction and haemorrhage are often clinically similar, but it is important to distinguish between these two conditions as subsequent investigation and treatment differ greatly. The acute management of thromboembolic infarct is aimed at destroying the clot with thrombolysis, but this is contraindicated in the presence of haemorrhage - therefore CT is the best first test**.**



Figer: 5

TYPE OF STROKE:

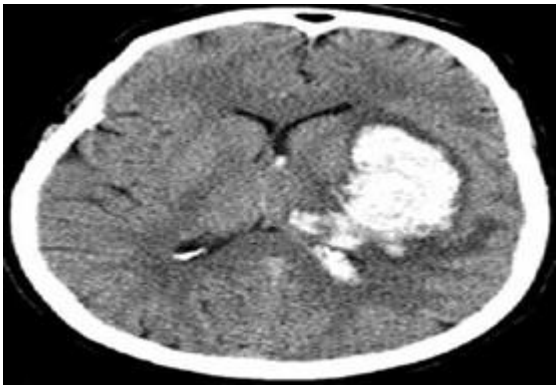
1. Ischemic stroke occurs when a vessel supplying blood to the brain is obstructed. It accounts for about 87% of all strokes.The main cause of ischemic stroke is atherosclerosis, or fatty deposits (plaque) that line the vessel walls. Fatty deposits can cause two types of obstruction (Cerebral thrombosis, Cerebral embolism).(6)



Figer: 3

2. Hemorrhagic strokes make up about 13% of stroke cases. They occur when a weakened vessel ruptures and bleeds into the surrounding brain. The blood accumulates and compresses the surrounding brain tissue.

The two types of hemorrhagic strokes are intracerebral hemorrhage (within the brain) or subarachnoid hemorrhage (between the inner and outer layers of the tissue covering the brain). (7)



Figer: 4

Stroke Symptoms & SIGNS

- **NUMBNESS** or weakness of face, arm, or leg, especially on one side of the body
- **CONFUSION,** trouble speaking or understanding speech
- **TROUBLE SEEING** in one or both eyes
- **TROUBLE WALKING**, dizziness, loss of balance or coordination
- **SEVERE HEADACHE** with no known cause

F.A.S.T. Warning Signs

- **F - Face Drooping** – Does one side of the face droop or is it numb? Ask the person to smile. Is the person's smile uneven?
- **A - Arm Weakness** – Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?
- **S - Speech Difficulty** – Is speech slurred?
- **T - Time to call 911** – Stroke is an emergency. Every minute counts. Call 911 immediately. Note the time when any of the symptoms first appear.(8)

CAUSES OF STROKE:

1. **High blood pressure**
2. **high cholesterol,**
3. **smoking**
4. **obesity**
5. **and diabetes are leading causes of stroke**
6. **ALCOHOL(9)**

DIAGNOSIS OF STROKE:

IMAGING TESTS

- **CT (computed tomography) or CAT scan.** It uses radiation to create a picture (like an X-ray) of the brain. It's usually one of the first tests given to a patient with stroke symptoms. CT test results give information about the cause of stroke and the location and extent of brain injury.
- **MRI (magnetic resonance imaging).** This test uses a large magnetic field to produce an image of the brain. Like the CT scan, it shows the location and extent of brain injury. The image produced by MRI is more detailed than a CT scan, so it's often used to diagnose small, deep injuries to the brain.
- **CTA (computed tomographic angiography).** In CTA, a special contrast material (dye) is injected into a vein and images are taken of the blood vessels to look for abnormalities such as an aneurysm.
- **MRA (magnetic resonance angiography).** In this test, the blood vessels are imaged through a magnetic resonance scanner to locate a blocked artery or to identify if a cerebral aneurysm is present.

Additional advanced tests that may be done include CT perfusion, diffusion-weighted MRI or MRI perfusion.

BLOOD FLOW TESTS

These tests give information about the condition of arteries in your head and neck that supply blood to your brain.

- **Cerebral angiography (or cerebral arteriography).** Special substances are injected into the blood vessels and an X-ray is taken. This test gives a picture of the blood flow through the vessels. This allows the size and location of blockages to be seen. This test helps in diagnosing aneurysms and malformed blood vessels.(10

The Aim of the STUDY...

The aim of this study to diagnosis brain stroke Then will discuss some types of the stroke and how to detect them by computed tomography(CT) for the purpose of receiving accurate treatment

Materials and Method:

The study was a retrospective and descriptive study conducted in symptomatic patients who were referred for CT of Brain at Baghdad province Medical city . All MRI of from 10 juniory to 10 March 2024 were reviewed.

In a CT scan of the brain, we do not use any devices or materials.

(Only contrast material when the examination requires it). We visualize the patient in thr The questionnaire form was filled out in the radiology department and CT unit by asking the patients directly. The form is attached at the end of the researchee levels: sagittal, transverse and coronal (3D).

Attached files

SAMPLE	AGE	**GENDER**	**SYMPTOMS**	**PATIENT WITH HYBERTENSION**	**PATIENT SMOKING OR NO**	**TYPE OF STROKE**
AZ	70	**MELL**	RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS -DIZZINESS	**YES**	**YES**	**ISCHEMIC**
A	55	MELL	-RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS -DIZZINESS	YES	YES	ISCHEMIC
B	48	FEMEL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	NO	ISCHEMIC

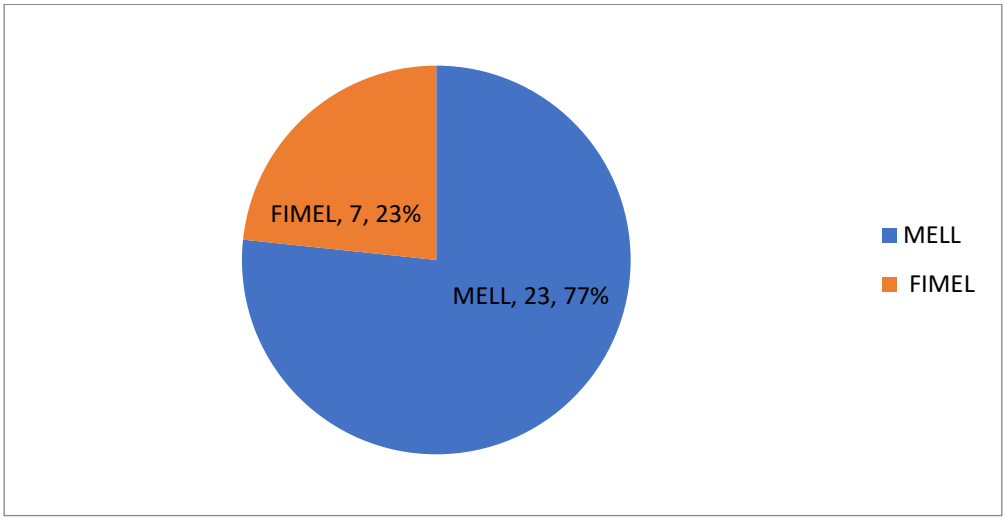
C	63	MELL	-RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	HEMORRHAGE
D	72	MEEL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	ISCHEMIC
E	61	MEEL	-RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	ISCHEMIC
F	78	FEMEL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS -FATIGUE	YES	NO	ISCHEMIC
I	52	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - FATIGUE	YES	YES	HEMORRHAGE
J	66	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - FATIGUE	YES	YES	ISCHEMIC
K	79	FEMEL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	ISCHEMIC
L	45	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	ISCHEMIC
M	51	MELL	-RIHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - FATIGUE	YES	YES	ISCHEMIC
N	68	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - FATIGUE	YES	YES	ISCHEMIC
O	70	FEMEL	IEFT SIDE WEAKNESS-LOSS OFCONSCIOUSNESS	YES	NO	ISCHEMIC
P	42	MELL	RIHT SIDE WEAKNESS-LOSS OFCONSCIOUSNESS	YES	YES	HEMORRHAGE
Q	53	MELL	IEFT SIDE WEAKNESS-LOSS OFCONSCIOUSNESS	YES	YES	ISCHEMIC
R	64	FEMEL	IEFT SIDE WEAKNESS-LOSS OFCONSCIOUSNESS	NO	NO	ISCHEMIC
S	32	MELL	RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS	YES	YES	HEMORRHAGE
T	49	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - FATIGUE	YES	YES	ISCHEMIC
U	58	MELL	-RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	HEMORRHAGE
X	82	FEMEL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	NO	ISCHEMIC
W	73	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	ISCHEMIC
Y	56	FEMEL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	HEMORRHAGE
Z	67	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS -	YES	YES	HEMORRHAGE
G	43	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - DIZZINESS	YES	YES	ISCHEMIC
AA	78	MELL	-RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - **NUMBNESS**	YES	YES	ISCHEMIC
AB	67	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - **NUMBNESS**	YES	YES	HEMORRHAGE
AC	62	MELL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - **NUMBNESS**	YES	YES	ISCHEMIC
AD	55	MELL	-RIGHT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - **NUMBNESS**	N0	YES	ISCHEMIC
AL	68	FEMEL	-IEFT SIDE WEAKNESS -LOSS OFCONSCIOUSNESS - NUMBNESS	NO	YES	ISCHEMIC

Address, body weight and genetic diseases are not available

RESULT:

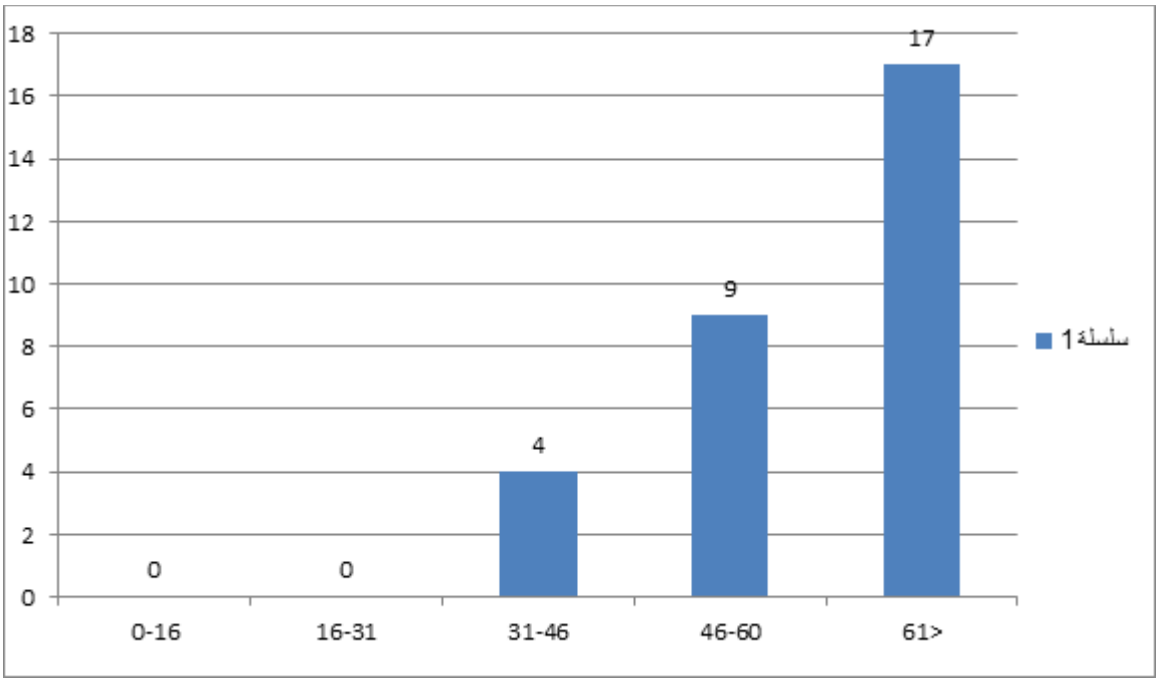
A total of 30 patients were included in this study. There were 23 (77 %) male and 7 (23 %) female patients. The age of the patients ranged from 32 to 82yearS.

GENDER



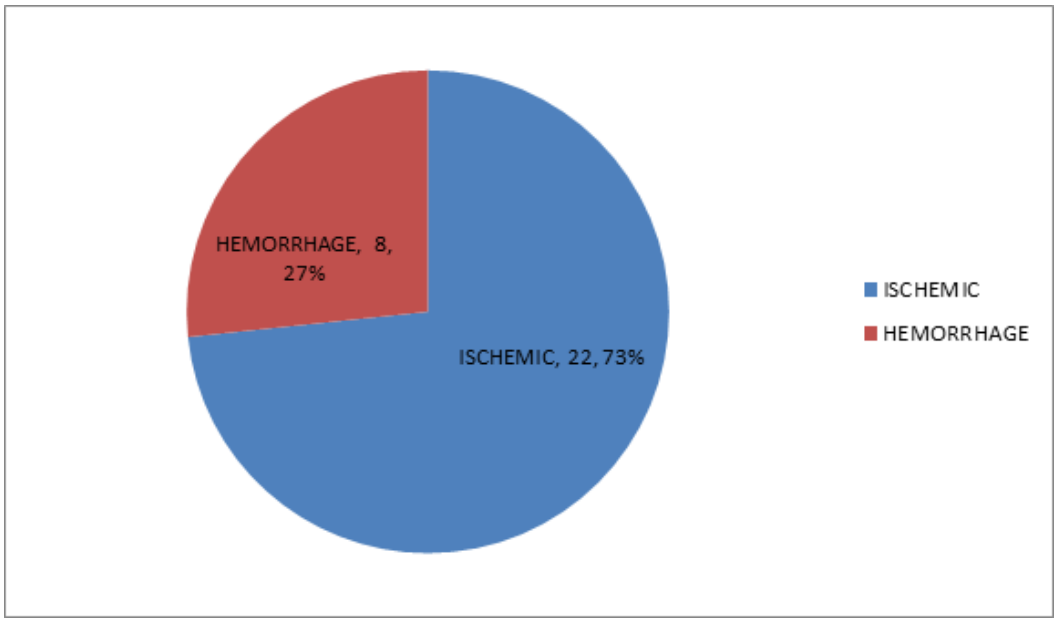
The peak incidence of stroke in this study was among the age groups of 60 years and above, as the number of people affected at these ages reached 17, with a total of 30 samples.

AEG



The number of cases that suffered from occipital hemorrhage in the brain was 8 samples (27%), and the number of cases that suffered from perfusion was 22 samples (73%).

TYPE OF STROK



Discussion:

The share of stroke cases among males was the highest, as the percentage of stroke cases reached 77.23%. While the percentage for females was low compared to the number of cases for males, as we found approximately three males and only one female among every four infected people.

The incidence of occipital hemorrhage in this study was 27%, and this percentage is higher than the common rate in previous studies, which is 15%. It is likely that this increase in the incidence of occipital hemorrhage is due to the increase in people with high blood pressure in the community in which the study was conducted, which is the main cause of the disease.

Based on previous research, the infection rate between ischemic and hemorrhage 6-1Perhaps the reason for this difference is that our research is limited to one hospital and a short period of time, so we recommend conducting research on a wider area and over a larger period of time.

Most of the infected people were smokers, in addition to suffering from high blood pressure, which is the main cause of the disease. This increase in infections in this short period is due to the spread of the phenomenon of smoking in society and in different ways compared to the number of smokers in previous decades, in which studies were conducted and the rates were lower in periods. Approximate time period.

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