UNIT – I INTRODUCTION

Clinical engineering: Definition, Evolution, Role, Responsibilities, Functional status, History of clinical engineering and Technology in Health Care System, Enhancing patient safety

HISTORY OF CLINICAL ENGINEERING AND TECHNOLOGY IN HEALTH CARE SYSTEM.

Modern medical care depends upon the use of a broad range of equipment and medical devices, resulting in an increasing demand for workers with technological expertise. We are going to see the history of medical device development and its support .

The Early 1900s

During this period health care was achieved by physicians going to homes for treatment. Medical facilities were not like today and the leading causes of death were pneumonia, influenza, tuberculosis, and dysentery, followed by heart disease and stroke. The development started gradually during this period

- The first X-ray machines were introduced following Roentgen's discovery of X -rays.
- The first use of contrast media occurred between 1906 and 1912.
- Dutch physiologist Willem Einthoven introduced the first ECG recording device, a string galvanometer, in 1901.It was large and heavy weighing about 600 lbs
- The first "telecardiogram" was recorded on March 22, 1905.

Pre-1940

- During the period between World Wars I and II (1919–1939), the development of medical instrumentation benefited from electronic amplification .
- The use of X rays for diagnosis continued to progress during this period
- Radium needles were used for the treatment of tumors.
- Lee de Forest's invention of the triode in 1906 led to more compact ECG machines
- W.T. Bovie, a physicist employed by the Harvard Cancer Clinic, developed a spark-gap electrosurgical machine that was first used in 1925

- Other medical devices commonly found at that time in the hospital included instrument sterilizers and, after 1927, large pressure chamber-type respirators known as “iron lungs” that were used to keep chest-paralyzed polio patients alive.
- 1943, the surgeon general authorized a three-month biomedical equipment technician training course.
- In 1918, a worldwide flu epidemic killed 20 million people. Germany developed sulfa class of drugs, which became the first pharmaceutical tools for use against infectious diseases.

The 1940s and 1950s

- This is the “golden age of medical electronics.” New technologies lead to development of new medical electronic devices.
- university-based research-and-development (R&D) labs were introduced.
- The teaching hospital-based model shops, often associated with a medical physics department, collaborated with creative, research-oriented physicians to develop many new aids .
- The area of interest got expanded beyond mechanical gadgets and toward electronic devices
- A-scan ultrasound was found during this period
- In medical physics department small R&D groups were formed to assist research-oriented physicians with the fabrication specialized research tools.
- Dutch physician Willem Kolff introduced the first artificial organ (an artificial kidney) at the end of World War II
- At this time, the first organ transplants were being performed
- During this period the first patient was treated using a heartlung machine
- respiratory problems reduced from 70% to 10% throughout the world

1960

- Wilson Greatbatch,implanted the first internal cardiac pacemaker. The battery life for these early units was only 12–18 months.
- The Institute of RadioEngineers (IRE) changed the name of the Professional Group on Medical Electronics(PGME) to the Professional Group on Biomedical Engineering (PGBME).
- The specialty of clinical engineering arose in the late sixties.

In 1970 high tech medical devices like Tomographic scanner, anesthesia machines, long-life nuclear batteries for use in implantable cardiac pacemakers were found

1980s:

During the 1980s, the widespread adoption of high-tech medical devices accelerated and collided with increased pressure to control health care costs. Due to costly devices as well as the device damage due to lag of clinical technicians caused increase in medical bills.

The Twenty-First Century

The experts tell us that a large percentage of medical errors occur because of lag of knowledge in handling equipments and technology. clinical engineering has evolved to become a crucial field in healthcare, focusing on the safe and effective use of technology in patient care.