

APPLIED ASPECT OF SURGICAL INSTRUMENTS

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Abstract -

Surgical instruments are hand-held tools or implements used by clinicians for the performance of surgical tasks. Surgical instruments are generally made by carbon steel, stainless steel, aluminum or titanium and are available in a range of sizes.

A vast assortment of instruments can be found in an operating suite. Scalpels, forceps, scissors, retractors, artery, clamps etc are used extensively. The nature of certain surgical procedures requires a more specialized set of instruments for example, bone saws, files, drills, and mallets are commonly utilized in surgical procedure. In this article author tried to establish the correlation between ancient descriptions of surgical Instruments from Ayurvedic texts along with latest designs of Instruments using in medical surgeries

Key words- Ayurvedic Surgical Instrument, Ancient Ayurveda, Instruments etc.

Introduction -

In ancient times, various types of instruments were described by Maharishi Sushruta such as Swastika yantra, Shandanshyantra, Tal yantra, Naadiyantra, Shalakayantra.¹ In this way, Maharishi Sushruta first described 101 types of instruments and 20 types of sharp instruments according to disease, Maharishi Sushruta described eight type of surgical process such as²

- Chhedan (Excision)
- Bhedan (Incision)
- Lekhan (Rubbing)
- Vedhan (Rubbing),

- Ahran (Extraction)
- Vishravan(Drainag),
- Seevan (Suturing)
- Aishan (Probing).

The surgical procedures that were described in ancient times have been adopted in modern science. The Instruments that we are using today in modern science have already been described in ancient times. Some Instruments have been prepared according to disease in modern science, but the basic feeling is of the instruments mentioned in Ayurveda. The instrument mentioned in ancient times has been used in modern scripture by giving it some new form. Depending on the disease, different types of instrument are used at different place. We will discuss about here some more common instrument which are mainly used in surgery³.

Some common instrument⁴ -

1. Artery forceps – it is also called spencer wells artery forceps .it has 2 blades and 1 ratched with uniform serration.

Use- it is used to control bleeding. Ones the bleeding points are caught, they aqre coagulated or ligature is applied.

The curved artery is commonly used, it is also available as straight artery, mosquito forceps.



2. Kocher's forceps- this is similar to an artery forceps with serration, it is available as curved and straight.

Use- it can be used to hold tough structures like aponeurosis fascia etc.



3. Allis tissue holding forceps – it has ratchet and triangular expansion at the tip
Use - it can be used to hold tough structures like aponeurosis fascia etc.



4. Sinus forceps – this is like an artery forceps which has no ratchet
Use – hold the wall of abscess cavity and drain it.



5. Babcock's forceps- an instrument with a ratchet and triangular expansion with fenestration at the opening end.

Use- hold the intestine , thyroid gland, mesoappendix uterine tube etc.



6. Swab holding forceps- this has a ratchet and two long blades.

Use- hold the swab (gauze pieces) to prepare the parts with antiseptic agents at the time of surgery.



7. Dissecting scissors – this is also called mayo's scissors it does not have ratchet ,it have sharp end. It has two type curved and straight

Use- this is used to dissect tissue planes during surgical operations and to cut or divide important structure.



8. Dissecting forceps - this is toothed forceps it is also available as non toothed forceps.

Use- it is very useful to pick the individual layers such as serosa, mucosa, skin etc.



9. Needle holder – this is a long instrument with a ratchet at non operating end. The operating end has two small blades with serration .

Use- it used to hold the curved needles.



10. Cheatles forceps – it is a long instrument having a curved shaft and the handle has no lock it is kept dipped in antiseptic solutions.

Use- it used to pick up sterilized articles such as sponges, gauze pieces or other instruments and to transfer to the instrument trolley.



11. Scalpel with blade- this is popularly called surgeon's knife.

Use- used to incise the skin and subcutaneous tissue.



12. Deaver retractor- this is popularly called Deaver liver retractor.

Use –it can be used to retract the liver during vagotomy, cholecystectomy etc.



13. Morris retractor- this is a long instrument with broad operating end.

Use –this is used to retract the abdominal wall.



14. Proctoscope – this is an instrument used to visualise the rectum and anal canal. It has an outer sheath with the handle and inner blunt part is called obturator .

Use –for rectal examination like piles, fistula ...



15. Suturing needles -The surgical needle allows the placement of the suture within the tissue, carrying the material through with minimal residual trauma. The ideal surgical needle should be rigid enough to resist distortion, yet flexible enough to bend before breaking, be as slim as possible to minimise trauma, sharp enough to penetrate tissue with minimal resistance, and be stable within a needle holder to permit accurate placement. Commonly surgical needles are made from stainless steel.

They are composed of-

- 1.The swaged end(eye) connects the needle to the suture
2. The needle body or shaft is the region grasped by the needle holder. Needle bodies can be round, cutting, or reverse cutting.

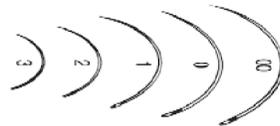
Round bodied- needles are used in friable tissue such as liver and kidney

Cutting- needles are triangular in shape, and have 3 cutting edges to penetrate tough tissue such as the skin and sternum, and have a cutting surface on the concave edge.

Reverse cutting- needles have a cutting surface on the convex edge, and are ideal for tough tissue such as tendon or subcuticular sutures, and have reduced risk of cutting through tissue.

3. The needle point -The needle point acts to pierce the tissue, beginning at the maximal point of the body and running to the end of the needle, and can be either sharp or blunt.

Use – suturing the skin , ligation of different body parts .



16. Trocar and cannula- This has two parts. The inner sharp part is the trocar and outer blunt part is cannula.

Use - It is used to drain hydrocoele fluid. Once hydrocoele sac is delivered, it is punctured with trocar and cannula, the trocar removed and the fluid, drained.

17. Male metallic catheter- It is a long instrument which is curved because the male urethra is long and curved. It has two eyes at the distal end which are situated laterally and at different levels so that the instrument does not become weak at that spot. Once the urine is drained, the catheter can be left in place by passing a thread through the two rings present at the proximal end and fixing them to patient's thigh.

Use- These catheters are used to drain urine in cases of retention of urine when rubber catheter fails.

18. Foley's self-retaining urinary catheter- This is made of latex with silicon coating. At the tip, there is a bulb, capacity of which is written at the other end. Before inflating the bulb, one must make sure that catheter is in the urinary bladder, not in the urethra. This is assessed by free flow of urine. After introducing the catheter, the bulb is inflated using

saline. Thus, it becomes self-retaining. After the usage, it is removed by deflating the bulb. It can also be used to drain peritoneal cavity as in biliary peritonitis. Inflated bulb compresses the prostatic bed and controls bleeding after prostatectomy.

Use - These catheters are used to drain urine in cases of retention of urine.

19. Towel clip - This instrument has a ratchet and the operating end is sharp. This is available in different sizes Once the part is cleaned and draped

Use- The clips are used to hold the towels in place.



20. T-tube (kehr's)- This is a flexible tube made of latex with a long vertical limb and a short horizontal limb.

Whenever the common bile duct (CBD) is incised, it is sutured after inserting the T-tube. The short horizontal limb is placed vertically within the common bile duct after making 2-3 holes within. Some surgeons slit open the entire length of the short limb. The long limb is brought to the exterior from the most dependent part of the common bile duct and connected to a sterile container.

Use- Presence of the T-tube may prevent peritonitis due to biliary leakage in cases of residual stones blocking the lower end of the CBD.

Conclusion –

Instrument is very important in modern surgery. A surgeon with no instrument is handicapped cannot do anything. A surgeon performing asurgical procedure should be able to assume that the instruments used are safe and reliable.

References –

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