

## Technical Note

# The use of IV-tubing as a closed-suction drainage system during neurosurgical cases in Tanzania

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## Abstract

**Background:** Commercial closed-suctions drainage systems are commonly used in the United States and many other countries for use in neurosurgical cases. However, in Tanzania and other developing nations with fewer resources, these are not available. This report explores another option for a closed-system drainage system utilizing inexpensive supplies found commonly in hospitals around the world.

**Methods:** Sterile IV-tubing is cut, inserted into the wound, and brought out through an adjacent puncture incision. For suction, an empty plastic bottle can be attached to the tubing.

**Results:** The IV-tubing closed-suction drainage system was applied in both cranial and spinal neurosurgical procedures, including as subdural, subgaleal, epidural, and suprafacial drains. It maintained suction and was an adequate substitute when commercial drains are unavailable.

**Conclusions:** This report illustrates how sterile IV-tubing can be adapted for use as a closed-drainage system. It utilizes inexpensive supplies commonly found in many hospitals throughout the world and can be applied to both cranial and spinal neurosurgical procedures.

**Key Words:** Africa, global health, neurosurgical techniques

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## INTRODUCTION

Closed-suction drainage systems are commonly used in both cranial and spinal neurosurgical cases. These systems are commercially made and widely present in the United States of America and many other areas of the world. However, in Tanzania and other developing

regions with fewer resources, these products are not available for use. By adapting local technology and supplies, local surgeons are able to overcome these limitations. Like the Malawi shunt,<sup>[1]</sup> homemade cervical collars, suture used as a hemostatic agents, and camping headlights and flashlights used in the operating theaters,<sup>[2]</sup> other methods must be employed



**Figure 1:** The IV tubing has been cut to size, with small holes cut into the end, which will remain in the wound (arrows)



**Figure 2:** An empty bottle is compressed, attached, and used as a closed-suction for the drain



**Figure 3:** The completed IV-tubing closed drainage system after wound closure and dressing

and applied in these circumstances. In this report, we show how sterile IV-tubing can be adapted for use as a closed-drainage system in neurosurgical cases. It has

been applied in various cases, including as subdural, subgaleal, epidural, and suprafacial drains.

## MATERIALS AND METHODS

Sterile IV-tubing is brought to the field. The tubing is cut to length, leaving the “spiked” end attached. The cut end is folded and one corner is cut off by scissors to create a small hole in the tubing. This is repeated approximately every centimeter, leaving multiple holes in the tubing [Figure 1]. These holes will be the part of the drain left inside the wound. A puncture incision is made in the skin a few centimeters from the wound edge. A clamp is inserted into the wound and brought out through the puncture incision. The drain is pulled into the wound by the clamp and set in position. To apply suction to the system, an empty plastic bottle (antibiotic, saline, etc.) is acquired after the wound is closed. The bottle is collapsed, rolled, and then attached to the spike on the IV-tubing [Figure 2]. The bottle can now be released, providing suction for the drain [Figure 3]. For prolonged suction, several empty bottles are used in case the previous one fills up.

## CONCLUSION

This simple method utilizes inexpensive supplies commonly found in many hospitals throughout the world and can be applied to both cranial and spinal neurosurgical procedures. The supplies for the IV-tubing drain cost less than 1 US Dollar in Tanzania. Also, it retains sterile technique and is safe and effective as a closed-drainage system.

## REFERENCES

1. Adeloje A. Use of the Malawi shunt in the treatment of obstructive hydrocephalus in children. *East Afr Med J* 1997;74:263-6.
2. Vargas J, Mayegga E, Nuwas E, Ellegala DB, Kucia EJ, Nicholas J. Brain surgery in the bush: Adapting techniques and technology to fit the developing world. *World Neurosurg* 2012. [In press].

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