CURRENT COMMENT

STUART C. CULLEN, M.D., *Editor*

GADGETS

Auxiliary Blood Pump Unit

Dr. Jack Moyers, of University Hospitals in Iowa City, Iowa, notes that the increasing use of pressure pumps with transfusion administration sets has presented several problems. Occasionally, commercial equipment for blood administration has a desirable filter and drip chamber, but the pump is not attractive, or cost considerations negate either the pump or the filter set when a combination unit is selected. In clinical practice the anesthetist is often faced with the decision as to whether to start a surgical procedure with a pump set, or a simple filter set. Often, as a matter of security, the more expensive pump set is selected, but in retrospect was unnecessary. In other situations, rapid transfusion was not anticipated and the entire setup had to be changed, the original set being entirely wasted. Moreover, there are patients admitted to the hospital, or transferred to surgery, with blood running, but more rapid transfusion unavailable without changing apparatus completely or using a 3-way stop cock, a method of blood pumping which requires more than one hand.

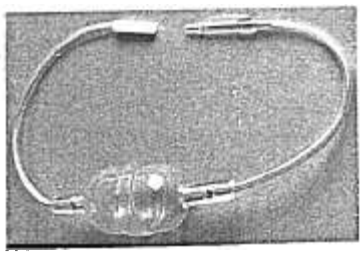
In order to obviate some of these problems of incompatibility, expense, and waste of time, an insertable auxiliary blood pump unit has been fashioned from a commercially available combination administration set with pressure pump. The only modification needed was an attachment of a plastic female adapter to the tubing several centimeters proximal to the pump bulb. The length of tubing distal to the bulb is such that the anesthetist can remain at the head of the table and still manually compress the bulb. The entire unit is about 60 cm. in length. Insertion between the distal male adapter of any transfusion unit and the female adapter of a needle placed intravenously (or other adapter leading to vessel lumen) can be accomplished quickly and simply.

Desirable features anticipated in the modification have been validated by clinical trials in various situations.

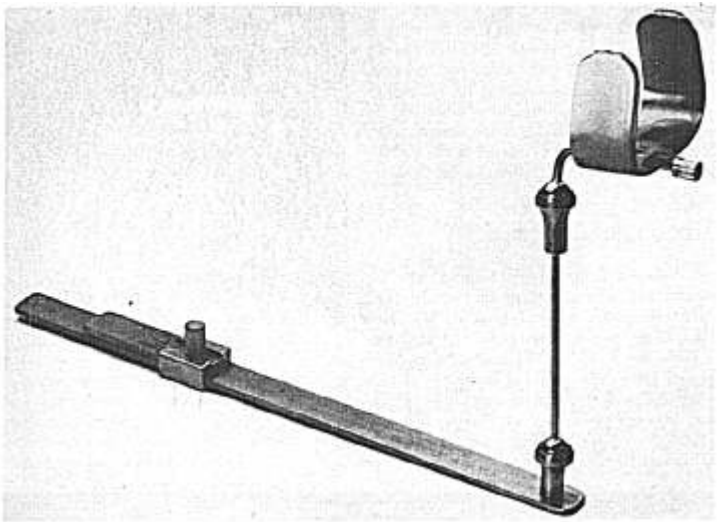
(1) Insertion of the unit into a transfusion setup previously established can be accomplished in about 15 seconds, from removal of unit from anesthesia machine drawer till blood is being pumped. Since no filter drip chamber needs to be filled and re-entry into blood bottle is unnecessary, a saving in time is afforded when comparison is made with a complete change of administration units from transfusion set without pump to a combination transfusion-pump set.

(2) The anesthetist can quickly adjust to urgent, rapid transfusion demands. If blood pumping is definitely anticipated the simple addition of the insertable unit can be made before doing the venipuncture. In those instances in which blood pumping is only a possibility or becomes necessary quite unexpectedly, insertion of the unit can be made without delay. The added expense of a pump set is never wasted, but the security of its availability is never denied.

(3) The uniformity of its adapters, both male and female, make the insertable unit compatible with any existing transfusion set which a hospital may be using. Furthermore the emergency patient sent in with blood running can be rapidly transfused regardless of whose product is between him and the bot-

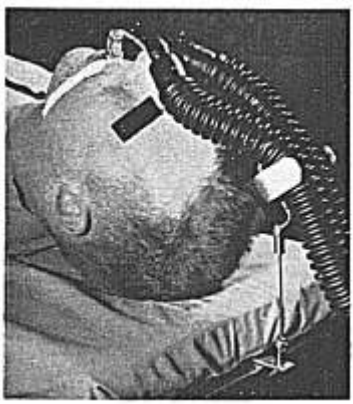


Auxillary blood pump unit.



Breathing tube support assembled.

sory sockets found on any operating room table (these are the sockets which hold the ether screen or shoulder support bars).



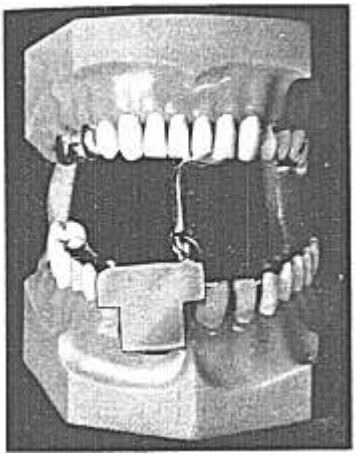
Tube support assembled for use with endotracheal tube.

When assembled, the "U" clamp holder may rotate 360 degrees on its own axis; in addition, it may also rotate 360 degrees in the horizontal plane and 280 degrees in the vertical plane at the base bar socket joint. This will also hold true when the extension bar is interposed between the base bar and "U" clamp (illustration).

How To Use the Breathing Tube Support

With Breathing Tubes, Inhaler "Y" With or Without Valves and Face Mask or Endotracheal Catheter. The flat base bar is slipped under the table pad under the patient's head and shoulders after the "U" clamp is snapped into the base bar socket. The corrugated breathing tubes are interdigitated and placed in the "U" clamp rotated and adjusted to the most natural position to take the weight of the head piece off the patient's face or forehead.

Vertical Use of the Breathing Tube Support. The base bar with the "U" clamp with or without the extension bar may be used in the



Modified blade in place with no pressure on flange. The blade functions as a standard Macintosh.

readily available in case a difficult laryngoscopy problem arises.

For some time Dr. Onkst has believed that if a means of protecting the teeth from the rigid flange could be incorporated into the blade itself and still offer all the advantages of the Macintosh blade, such a blade would be extremely useful to the anesthesiologist. A blade was custom made for him and has now been used in hundreds of patients to the complete satisfaction of all who have used it.

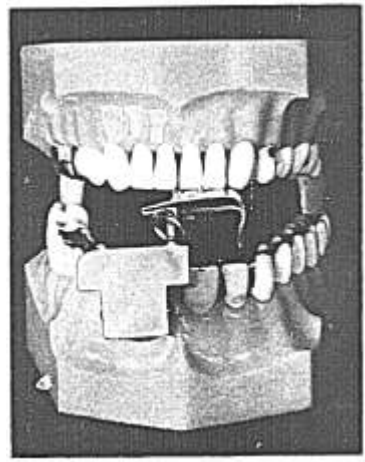
Design

The popular medium adult size 3 Macintosh blade has been modified as illustrated. As may be seen in the figure, the flange was cut from the bulb to the base of the flange and a hinge interposed. A coiled wire spring with very minimal tension holds the flange at a right angle to the blade (see illustration). With slight pressure on the flange the flange begins to fold toward the midline. With increasing pressure, or in cases where there is a narrow space between the upper and lower dental arches, the flange can fold through a 90-degree arc until it is parallel to the blade itself (see illustration). In this position any undue pressure on the upper incisors is distributed over a wide flat surface rather than the comparatively narrow surface of the standard Macintosh. A metal piece incorporated into the flange prevents it from folding away from the midline and into the line of vision.

The flange may easily be taken apart for cleaning purposes by simply removing the hinge pin. It has been suggested that occasionally the anesthesiologist may wish to remove the flange prior to laryngoscopy. In no case in Dr. Onkst's experience has it been found advantageous to remove the flange since the height of the vertical component is so markedly reduced when pressure is applied.

Discussion

Ideally, a laryngoscope blade should not touch the teeth during laryngoscopy. Unfortunately, for one reason or another, the flange may impinge on the upper anterior teeth with resulting trauma. With the blade described above, when the flange encroaches on these teeth during a difficult intubation, the flange folds toward the midline, but can still keep a large tongue out of the laryngoscopist's line of



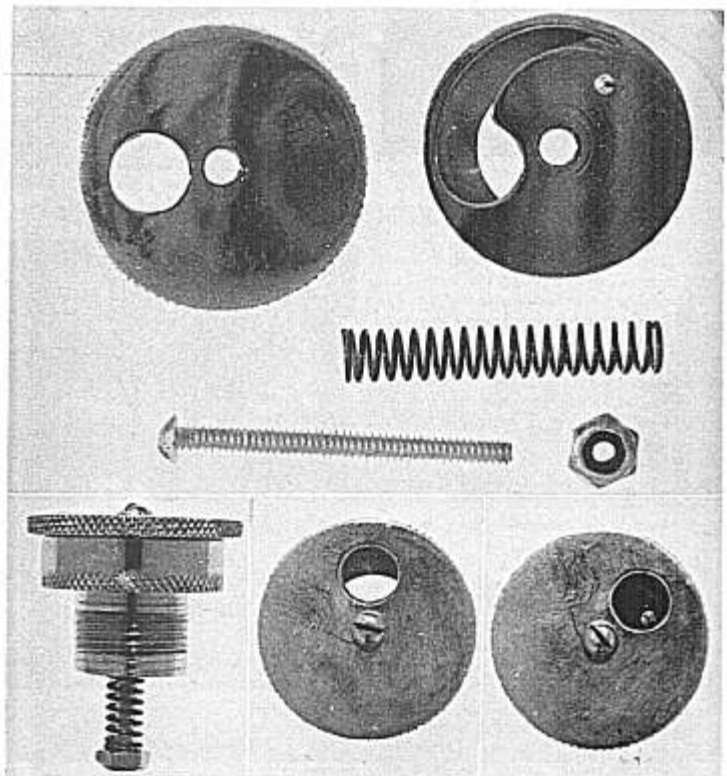
Modified blade in place with pressure on flange. The flange has folded to the lowest position. Note the decrease in vertical dimension and the broad flat surface of the flange that contacts the upper incisors.

vision. The more pressure that is exerted by the impinging teeth the more the flange folds. The lingual aspect of the flange is smooth, even when folded, and on no occasion has it traumatized the tongue.

In actual use, not only does the hinged flange prevent trauma to the teeth, but perhaps of even greater value is the fact that the instant the slightest pressure is applied to the teeth by the flange, the flange starts to fold and the laryngoscopist immediately becomes aware that his technique is faulty and can correct his technique before the teeth are damaged. This feature has been found to be of great value to those who are inexperienced in endotracheal intubation.

"Pop-Off" Valve

Drs. Frank W. Summers and Richard A. Koons of the University of Southern California in Los Angeles have devised a bleed valve for excess anesthetic gases that has proved



useful. It is designed for use on the anesthesia circle absorption system. This design makes no claims of originality—there are only limited ways to leak excess gases—but it does eliminate a number of minor annoyances present in currently manufactured bleed or "pop-off" valves. The click-stops, inadequate opening, and lack of fine control of the multiple orifice-type valves (*e.g.*, Foregger-Neff), and the multiple turns and sticking disks of the spring-loaded "pop-off" valves (*e.g.*, Heidbrink, McKesson, E & J) are eliminated. This stick-proof valve is simply and sturdily designed of heavy brass and is easily cleaned. The tapered teardrop orifice gives a long differential scale that can be varied from a very small orifice to a large opening with a half-circle turn.

CASE REPORT

Perforation of the Right Lymphatic Duct with Stellate Ganglion Block

Dr. Paul H. Lorhan, of Harbor General Hospital in Torrance, California, reports a complication after right stellate ganglion block. Bonica (Management of Pain, Philadelphia, Lea & Febiger, 1953, p. 430) reports a case of laceration of the thoracic duct by the needle used for a left stellate ganglion block by the anterior approach. The thoracic duct is the main collecting trunk of the lymphatic system and extends on the left side from the second lumbar vertebra along the spinal column and course of the aorta to the junction of the left internal jugular and subclavian vein. The right lymphatic duct, which is the common trunk of the jugular and subclavian trunks, is presumably less vulnerable to injury or perforation.

A woman, age 41, had a right radical mastectomy in 1959 concurrently with radiation therapy. Subsequently, she developed marked lymphedema and inability to completely flex the right arm. In May of 1960, a right stellate block was recommended. During the interim she received a number of stellate blocks with marked benefit. In April of 1961, she returned because of increased swelling of the arm. A right stellate block was done by the anterior-lateral approach with a 3-inch, 20-gauge short-beveled needle. Following insertion of the needle and aspiration prior to injection of the agent, 3 ml. of a milky fluid was aspirated. The needle was withdrawn and pressure applied. The needle was then redirected without incident and a successful block obtained.

The right lymphatic duct is small in comparison to the thoracic duct. It was postulated that in this patient the lymphatic duct or one of its branches was partially obstructed by fibrous tissue as a result of the extensive radiation therapy resulting in dilatation of the duct or its branches.

CORRESPONDENCE

Vinyl Tubing

To the Editor.—During the past year we have observed two instances in which vinyl tubing (BD No. VX020) used for repeated epidural injections has broken. In both of these cases, epidural block had been maintained over a period of a week for the relief of chronic pain. At this time we noted that the usual injection of local anesthetic solution failed to afford pain relief. The gauze dressing at the point of entry of the tube into the back was found soaked with solution. On removing the dressing we found that the tubing had broken about 1 cm. under the skin. This left the distal portion of the tubing buried in tissue with one end within the epidural space. In both patients when the tubing was removed surgically, it was found to be milky white and brittle.

These experiences contradict the general impression among anesthesiologists that vinyl tubing is nonreactive in tissue and presumably inert. This impression persists in spite of the