Transparent Surgical Drapes

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Plastic sheets offer several advantages as surgical drapes, namely: (a) bacterial impermeability, wet or dry, (b) nonabsorbency, and (c) transparency. Although Conway and Neumann ¹ discussed the advantages of transparent drapes for the visualization of surgical landmarks during plastic surgery about the head in 1950, the transparency of plastic has not been utilized fully in surgical draping. Indeed, some currently available plastic drapes are purposefully made opaque.² ³ ⁴

Transparent drapes facilitate anesthetic management by allowing visual monitoring of skin color or developing skin rashes; respiratory muscle activity and signs of airway obstruction; clinical signs of anesthetic depth; and the proper connections of patients to anesthetic and monitoring equipment and intravenous tubing. Additionally, the nonabsorbency of plastic drapes aids in obtaining accurate measurement of blood loss, particularly if the drapes are made adherent to the skin around the incision site so that no blood will accumulate under the patient in the mattress.

Transparency of the surgical drapes permits the surgeon to visualize anatomic landmarks, the patient’s position, and the color of the extremities during vascular surgery. The surgeon can be given more working room because armboards are unnecessary; in head and neck or pediatric surgery the traditional large “ether screen” can safely be eliminated because the anesthesiologist can see the head through the drapes.

Because of the advantages of visualization of the patient during operation, we undertook to develop transparent plastic surgical drapes and study their use during anesthesia and operation. The drapes were made from 2-mil polyethylene sheets.† Polyethylene is flame-resistant and can be made antistatic by incorporation of an antistatic compound in the plastic. Polyethylene was chosen rather than the more clearly transparent polyvinyl chloride because of ecologic considerations in making a disposable drape. The end products of combustion of polyethylene, carbon dioxide and water, are less pollutant than the residuals of polyvinyl chloride.

The drapes are made in standard laparotomy-drape sizes and in half-sizes. One style is designed with a 4 inch-by-8 inch rectangular fenestration. Adhesive surrounds the fenestration so that the drape adheres to the skin around the incision site. A second type of drape has no aperture, and the surgeon can cut an appropriate hole to suit the requirements of the operation. This is particularly useful in head and neck surgery and in operations on babies where only a small incision is to be made. Plastic adhesive tape is used to attach suction tubing and cautery lines to the drapes without the use of towel clips, which would puncture the material. The drapes are gas-sterilized at the factory.

We have used these drapes in more than 100 operations in our pediatric operating rooms, on patients ranging in age from three days to 17 years and for all types of surgery. Because of reports of heat retention under plastic drapes,⁵ the patients’ temperatures were carefully observed; room temperature was maintained at levels we have found appropriate for cloth drapes, 70 F for patients weighing more than 30 pounds, 76 F for patients between 10 and 30 pounds, and 80 F for infants weighing less than 10 pounds. Only one patient developed a significant fever, an increase in temperature of 3 F after six hours of surgery. This was the only patient in the series who needed cooling by use of a thermal blanket.

The strength of the drapes was adequate. There was no accidental tearing or perforation

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† Designed and provided by the 3M Co., St. Paul, Minn.
of the material. Clare was a minor problem; it was less than with white drapes, but more than with blue drapes. Some surgeons felt distracted by vision of the whole patient and by seeing the anesthesiologist's activity. Instruments tended to slip off the plastic drapes, and it was necessary to overcome this problem by use of a magnetic pad under the drape or a sponge-rubber instrument pad placed over the drape.

Metabolism

NEONATAL CALCIUM TURNOVER  Limited data on abnormalities of calcium turnover in the sick neonate are available. The purpose of the present study was to evaluate the correlation between clinical signs and symptoms of hypocalcemia with plasma calcium ion activity. Three situations are used to illustrate the discrepancies between measured levels of total and ionized calcium that can occur. These include age, treatment of acidosis with sodium bicarbonate, and exchange transfusion.

Calcium ion activity was measured in a sample of venous or arterial blood utilizing a calcium-selective flow-through electrode. The mean level of ionized calcium in umbilical venous plasma was 2.48 mEq/l. In the sick infants it decreased to 1.35 mEq/l within 30 hours after birth. Total calcium concentrations were in the normal adult range at birth (5.3 mEq/l) and declined subsequently to a subnormal 3.47 mEq/l 30-40 hours past partum. Thus, both total and ionized calcium decreased within 30 hours in sick infants. Ionized calcium ion levels of 1.4 mEq/l or less were associated with total calcium levels equal to or less than 3 mEq/l in 80 per cent of patients. Symptoms and signs attributable to hypocalcemia or hypomagnesemia, or both, were found only in infants in whom plasma levels of both divalent cations were below the lower limit of normal. Administration of sodium bicarbonate to correct metabolic acidosis caused a slight increase in plasma pH and a decrease in calcium ion activity. During exchange transfusion with acid-citrate-dextrose (ACD)-Tham-buffered blood, there was a consistent decrease of calcium ion activity with a simultaneous rise in total calcium levels, suggesting that the signs of hypocalcemia may arise in association with near-normal total calcium concentrations.

Although previous reports had indicated the presence of hypocalcemia in the neonatal period, its existence had not been correlated with clinical symptoms, nor was the discrepancy between total and ionized calcium levels full appreciated. The time course of hypocalcemia after alkalization with sodium bicarbonate is rapid (within 5 minutes), and the authors suggest that metabolic acidosis be corrected carefully. (Radde, I. C., and others: Calcium Ion Activity in the Sick Neonate: Effect of Bicarbonate Administration and Exchange Transfusion, Pediat. Res. 6: 43-49, 1972.) Error's COMMENT: Another reason why indiscriminant correction of metabolic acidosis may prove to be a curse rather than a blessing.

REFERENCES