

# PERFUSION AND INFUSION COMPLICATIONS

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## PERFUSION

Between December, 1957 and October, 1965, 509 perfusions were performed for patients at the M. D. Anderson Hospital. Five of the patients died of causes which could be attributed to the operation. One of the five patients died of toxicity incident to massive necrosis of tissue following the perfusion. This patient had an inoperable carcinoma of the vulva with metastases to both groins, for which she had been treated surgically and with radiation. The second patient died of septicemia incident to severe bone marrow depression from excessive leakage of the drug. A third patient died following pelvic perfusion for a recurrent carcinoma of the vagina; intractable bleeding in the perfused region, apparently caused by a local toxic action of the chemotherapeutic agent upon the capillaries that prevented their contraction, was responsible for the fatal outcome. A pulmonary embolus, which developed during the postoperative period, was responsible for the deaths of the fourth and fifth patients.

The remaining complications were classified as systemic or local. Seven patients had profound bone marrow depression following excessive leakage of the compound from the perfusion circuit. Since the institution of a method of continuous monitoring of leakage in 1959, no evidence of serious bone marrow depression in these patients has been observed.

The most severe local complication associated with perfusion was tissue necrosis following an excessive dose of the chemotherapeutic agent. Amputation of the perfused extremity of seven patients was necessary because of this complication. Six of the seven patients had large malignant tumors of an extremity, for which amputation would have been mandatory in any event. All of the seven amputations were performed during

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the first two years of this experimental project, when tolerance of the local tissues to maximum doses of the drug were being determined.

Eight patients suffered an uncomplicated thrombophlebitis. Following iliac perfusion, one patient had a massive streptococcal necrotizing fasciitis, for which drainage through multiple incisions was necessary. Two other patients had symptomatic peripheral neuritis subsequent to perfusion of the extremities.

### INFUSION

A total of 170 intra-arterial infusions were performed. Twelve patients, all of whom had cancers that were not curable by surgical treatment or irradiation, died after infusion through the carotid artery. The immediate causes of death were pneumonia, liver failure, septicemia from severe bone marrow depression, necrosis of a cerebral tumor, respiratory obstruction related to delayed tracheostomy, and vascular complications. The last included thrombosis of a carotid artery, air embolus, breaking off of atheromatous plaques and consequent hemolysis, rupture of a carotid aneurysm at the site of the arteriotomy, and rupture of the artery at the site of the arteriotomy. It should be stated that almost all of these vascular complications developed during our early experience with infusion, usually being caused by direct catheterization of the carotid artery. The practice of opening the artery was discontinued three years ago; since that time, it has been approached in a retrograde fashion, through the superficial temporal artery.

Symptoms of varying degrees of drug toxicity developed in 15 patients. Four patients had severe infections of the wound and two others had a major slough of the skin. Malfunction of the catheter, i.e., leaking, breaking, clotting and dislodgement from the artery, was encountered on 16 occasions. This difficulty has largely been obviated by the use of a polyvinyl or teflon catheter, rather than the older polyethylene type.

In summary, most of the complications of infusion have been overcome by 1) the use of an indirect retrograde approach to the carotid artery, 2) meticulous attention to surgical techniques with reference to the prevention of infection and to fixation of the catheter, and 3) the use of an improved catheter.

### RESUMEN

La mayoría de las complicaciones por infusión fueron evitadas: 1) utilizando la vía retrógrada para llegar a la arteria carótida; 2) cuidando meticulosamente las técnicas quirúrgicas con el objeto de prevenir la infección y la fijación del catéter, y 3) la utilización de un catéter de polivinilo o de teflon.