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CONTENTS

AN INTRODUCTION TO THE CLINICAL APPLICATIONS OF OXIMETRY

Howard B. Burchell, M.D., Ph.D. in Medicine, Division of Medicine: While photo-electric determination of the saturation of blood with oxygen was used in Europe prior to World War II, it was in its application to wartime problems in flying that it was used extensively in this country. During the war years, photo-electric determinations of the oxygen saturation of the arterial blood by using an ear oximeter were used in the Royal Air Force, the German Air Force and the United States Air Force, and in the last-named air force, it had a widespread application in the training of fliers. It was particularly valuable in the demonstration that desaturation of the arterial blood occurred independently of the presence of cyanosis, when prospective or actual air crews were indoctrinated by simulated ascents to altitude in low pressure chambers. It was evident that after the war

A PLASTIC NEEDLE

David J. Massa, M.D., Fellow in Anesthesiology, Mayo Foundation, John S. Lundy, M.D., Albert Faulconer, Jr., M.D., M.S. in Anesthesiology and Roger W. Ridley, M.D., M.S. in Anesthesiology, Section on Anesthesiology: The needle consists of a short length of transflex tubing* of suitable diameter, fixed at one end to a hub and tapered to its inside diameter at the free end, through which a steel needle has been passed as a stylet.

TECHNICAL DETAILS†

The stylet-needle is a 3-inch no. 19 Becton-Dickinson needle (fig. 1*a*). The cannula hub is a shortened no. 16 Becton-Dickinson needle, the shaft of which is reduced to a length of 3/8 inch and is shallowly notched in several places to provide for a firm junction with the tubing (fig. 1*a*.). The transflex tubing used is no. 22, in 3-inch lengths, and is referred to as the "cannula" (fig. 1*a*).

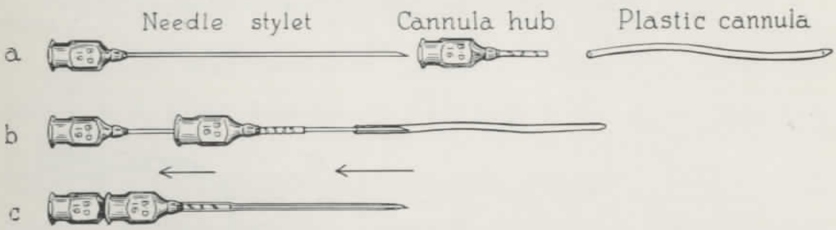

Fig. 1. Details of the assembly of the plastic needle.

The 3-inch length of tubing is soaked in acetone for two minutes and is rinsed in water for a few seconds. The limp enlarged tube is then slipped over the stylet-needle, which has been passed through the cannula hub, care being taken not to perforate the soft tubing with the needle point (fig. 1*b*). With the tube in place over the shaft of the cannula hub, it is allowed to dry 10 minutes. The tip (1 inch) of the plastic needle is again dipped into acetone for two minutes, rinsed quickly in water and allowed to dry ten minutes. The entire assembly is autoclaved twenty minutes in a cotton-stopped test tube. When the assembly is cool, a smooth taper is carefully placed on the tubing with a rotary cloth buffer, so that the edge of the tubing coincides with the bevel of the needle (fig. 1*c*). This process will eliminate the square "shoulder" at the junction of the free end of the

*Tubing manufactured by the Irvington Varnish and Insulator Co., Irvington 11, New York.
†The plastic needle, completely assembled, can be obtained from the Rochester Products Company, Rochester, Minnesota.

cannula and the stylet-needle. Finally, the plastic needle is sterilized by autoclaving for twenty minutes at 15 pounds' pressure.

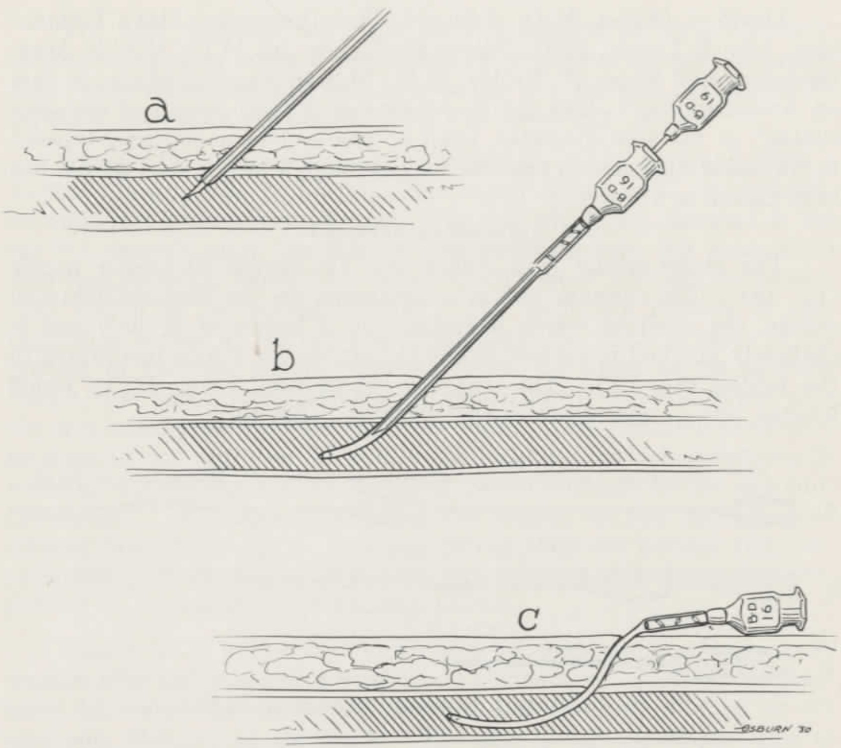

Fig. 2. Technic of venipuncture when the plastic needle is used.

USE OF NEEDLE

The plastic needle is introduced into a vein, as is any ordinary needle (fig. 2*a*). When the needle has been advanced so that the tip of the cannula is well into the vein, the stylet-needle is withdrawn approximately ¼ inch (fig. 2*b*), and with a gentle forward motion on the cannula hub, the needle is advanced as far as desired. The stylet-needle is then removed entirely, and any fluid desired is attached to the cannula hub (fig. 2*c*).

The cannula hub may be fastened in the usual manner with adhesive tape.

ADVANTAGES AND APPLICATIONS

The cannula has the advantages that it will rarely puncture the wall of the vein as does a steel needle, its flexibility allows a greater degree of comfort for the patient, and introduction is simpler than the introduction of a plastic tube through a steel needle.

Many possible applications of the plastic needle are obvious. It has proved to be most useful in the prolonged intravenous administration of fluids. A modification has been used in caudal anesthesia to replace the catheter or malleable needle. Its value is suggested for such applications as continuous nerve block, such as sympathetic trunk, brachial plexus and stellate ganglion blocks.

RECENT PUBLICATIONS BY MEMBERS OF THE STAFF

Bickford, R. G.: Automatic Electroencephalographic Control of General Anesthesia. Electroencephalog. & Clin. Neurophysiol. *2*:93-96 (Feb.) 1950.

Boucek, R. J. and Grindlay, J. H.: Experimental Differential Inflow Obstruction in Dogs' Hearts. (Abstract.) Federation Proc. *9*:15 (Mar.) 1950.

Broders, A. C.: Functioning Cancer. Virginia M. Monthly *77*:156-165 (Apr.) 1950.

Carryer, H. M. and Code, C. F.: Release of Histamine During Hemolytic Reactions in the Blood of Rabbits. Proc. Soc. Exper. Biol. & Med. *73*:452-455 (Mar.) 1950.

Dworetzky, Murray and Boquet, P. Physiologic Responses of Certain Animals and Isolated Preparations to Mixtures of Snake Venoms and Egg Yolk. (Abstract.) Federation Proc. *9*:35-36 (Mar.) 1950.

Jones, C. S., Baldes, E. J., Faulconer, Albert, Jr. and Saari, John: Ether Concentration in Gas and Blood Samples Obtained During Anesthesia in Man and Analyzed by Mass Spectrometry. (Abstract.) Federation Proc. *9*:68 (Mar.) 1950.

Lambert, E. H., Beckett, Sibyl, Chen, C. J. and Eaton, L. M.: Unipolar Electromyograms of Patients With Dermatomyositis. (Abstract.) Federation Proc. *9*:73 (Mar.) 1950.

Livermore, G. R., Jr. and Code, C. F.: Gastric Secretory Inhibitor Factor in Canine Gastric Juice. (Abstract.) Federation Proc. *9*:80 (Mar.) 1950.

Morgan, E. H. and Nahas, G. G.: Investigation of Polarometric Method for Oxygen Tension in Blood With a Rotating Platinum Electrode. (Abstract.) Federation Proc. *9*:91-92 (Mar.) 1950.

Owen, C. A. and Zeller, E. A.: Diamine Oxidase in Streptomycin Sensitive and Resistant Strains of Mycobacterium smegmatis. (Abstract.) Federation Proc. *9*:212 (Mar.) 1950.

Pruitt, R. D.: Spread of Excitation Process in Ventricular Myocardium of Dogs. (Abstract.) Federation Proc. *9*:102 (Mar.) 1950.

Roth, Grace M.: Effects on Normal Subjects of Smoking Cigarettes With Varying Concentrations of Nicotine. (Abstract.) Federation Proc. *9*:110 (Mar.) 1950.

Sprague, R. G., Hayles, A. B., Power, M. H., Mason, H. L. and Bennett, W. A.: "Steroid Diabetes" and Alkalosis Associated With Cushing's Syndrome: Report of Case, Isolation of 17-Hydroxy-Corticosterone (Compound F) From Urine, and Metabolic Studies. J. Clin. Endocrinol. *10*:289-306 (Mar.) 1950.

Sprague, R. G., Mason, H. L. and Power, M. H.: Studies of the Effects of Adrenal Cortical Hormones on Carbohydrate Metabolism in Human Subjects. Am. Diabetes A. Proc. *9*:147-166, 1949.

Van Herik, Martin and Good, C. A.: Comparative Accuracy of the Chassard-Lapiné and Recumbent Positions in Roentgen Measurement of the Pelvic Outlet. Radiology *54*:392-397 (Mar.) 1950.

Volwiler, Wade, Grindlay, J. H. and Bollman, J. L.: The Relation of Portal Vein Pressure to the Formation of Ascites—An Experimental Study. Gastroenterology *14*:40-55 (Jan.) 1950.

Wakim, K. G.: The Physiologic Aspects of Therapeutic Physical Exercise. J.A.M.A. *142*:100-108 (Jan. 14) 1950.

Wakim, K. G., Gersten, J. W., Elkins, E. C. and Martin, G. M.: Objective recording of Muscle Strength. Arch. Phys. Med. *31*:90-100 (Feb.) 1950.