
BRIEF NOTE

A Chart for the Proportion of Donor Blood in the Body after Repeated Transfusions by Replacement

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REPLACEMENT transfusions have been widely used in the past decade as treatment for hemolytic disease of the newborn and also occasionally before surgery on patients with hemophilia. Moreover, repeated transfusions may be necessary in certain cases of poisoning as a life-saving measure.

There are basically two different methods of replacement transfusion: the continuous and the intermittent method of withdrawal and transfusion. In the continuous method, the donor's blood is supplied through a vein and simultaneously the patient's blood is withdrawn at the same rate. The method is described by Wiener and Wexler,¹ who also give a graph representing the proportion of donor blood in the patient's body as a function of the amount of blood injected. Both the continuous and the intermittent technics have been discussed by Wallerstein and Brodie,² and the intermittent method has been extended by Veall and Mollison³ to allow for cases in which the hematocrits of donor and patient differ.

The purpose of this note is to present a simple chart for the intermittent exchange technic by which the proportion of donor blood in the patient's body after the n -th transfusion can be read off with ease. The work was originally suggested by B. F. Short and A. H. Brook, Division of Animal Physiology, C.S.I.R.O., Prospect, N.S.W., who have since used the chart successfully for their experiments on Merino sheep.

Let V be the total volume of the patient's blood, v the volume replaced during one transfusion, and $R = v/V$ the proportion of blood replaced. It can be shown easily that the percentage $P(n)$ of new blood in the patient's body after n transfusions is $P(n) = 100 (1 - (1-R)^n)$. Alternatively, the relationship $P(n) = 100R + (1-R) P(n-1)$ between the percentages of new blood in the patient's body after the $(n-1)$ -th and n -th transfusions is useful as a reduction formula. The latter formula was used to construct the chart.

SUMMARY

A chart is presented from which the percentage of donor blood in the patient's body after any number of substitutions of a fixed quantity of blood can be read off.

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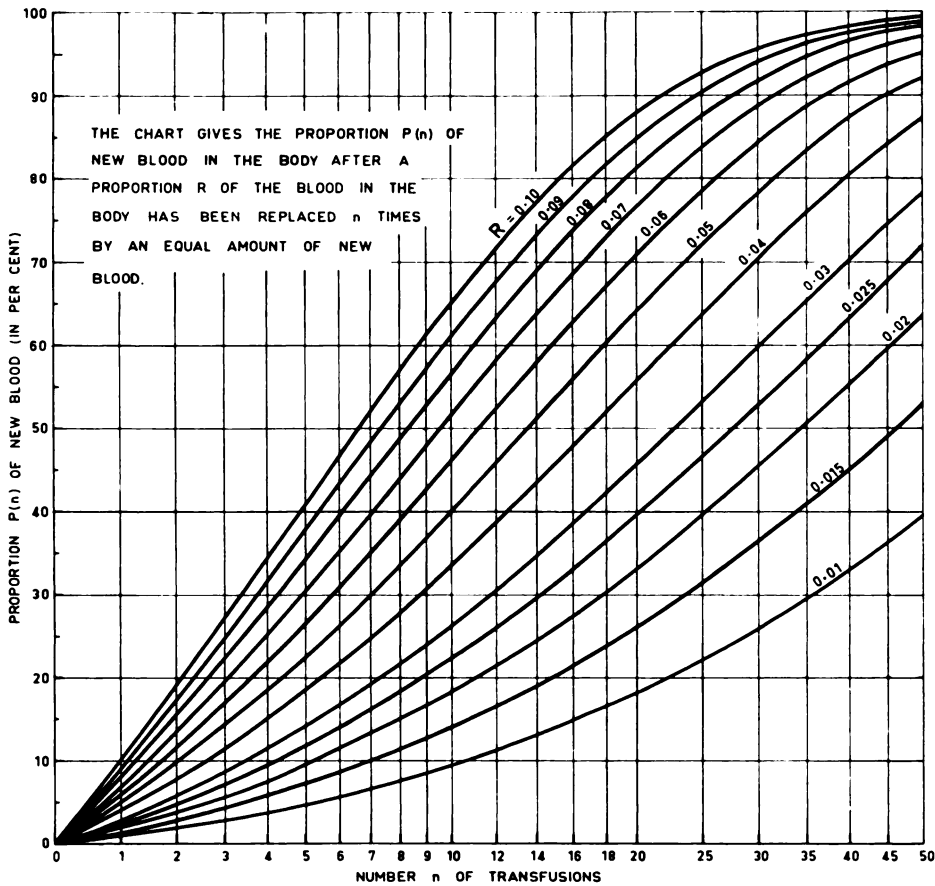


Fig. 1.—Proportion of donor blood in the body after n transfusions.

SUMMARIO IN INTERLINGUA

Es presentate un graphico que permette le lectura directe del procentage de sanguine de donator que es presente in le corpore del patiente post non importa qual numero de transfusiones substitutori de un fixe quantitate de sanguine.

REFERENCES

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