



HEMOPOCKET: AN UTILITY FOR APHERESIS DONATIONS

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Abstract

The advances in medical treatments requiring transfusions and the aging of the population are expected to increase the demand of blood and blood components. Therefore, blood banks must guarantee the quality of their collections and the security of their donors and patients. Additionally, blood donation procedures require individual orientation since each donor/patient has unique characteristics (weight, height, hematocrit concentration, platelet count, etc). HEMOPOCKET© is a mobile application aimed to help blood bank staff (physicians, nurses, technicians) in assessing donors/patient for apheresis processes.

Keywords

Hematology, apheresis, mobile application.

Introduction

Since human blood is a substance that currently cannot be synthesized, it is necessary to obtain it from another person, i.e, a blood donor. Apheresis, is a type of donation that involves removing whole blood from a donor or patient and separating the blood into individual components, such as platelets or plasma. The remaining blood components then are re-introduced back into the bloodstream of the patient or donor. Apheresis allows collecting the optimal number of blood components at each donation. Furthermore, the components obtained by apheresis contain less impurities and it is possible to make a donation more frequently.

However, blood components or blood products have an expiration date; for example, platelets can only be stored during five to seven days. Added to this, these products are highly demanded in patients with leukaemia or undergoing chemotherapy.

These restraints require a rational use of blood products and the proper assessment of the potential donation of a volunteer donor. In order to evaluate donor capacity and guarantee the security of the donors and patients, the specialists, prior to carry on an apheresis process, perform a series of calculations. These calculations, that can be performed manually or on a computer, are aimed to get the values of haematological variables and

consequently optimize the use of the resources and time.

HEMOPOCKET© is a mobile application, available on iOS and Android, and consist of an hematological calculator to help to hematologists and laboratory staff to better assess donor capacity. The ubiquity of the application allows users to calculate the hematological variables no matter where they are.

About the App

HEMOPOCKET© was implemented in the iOS 7.1.2 and Android KitKat 4.4. The app consists of one screen with two different working areas as depicted in Figure 1 (iOS) and Figure 2 (Android). Touch screen gestures enable users to interact with or tap on the app, improving app's handiness. An **info icon** has been enabled to provide technical information and support as it is shown in Figure 3.

App Features:

The application interface is composed of two differentiated working areas: A) Blue area B) Green area

A) Blue area

Two edit box enable the user to introduce height and



weight of the donor. By activating the corresponding buttons, height and weight values can set in the following units: m, cm, Kg and gr. Genre is selected by the user tapping on the buttons: male, female.

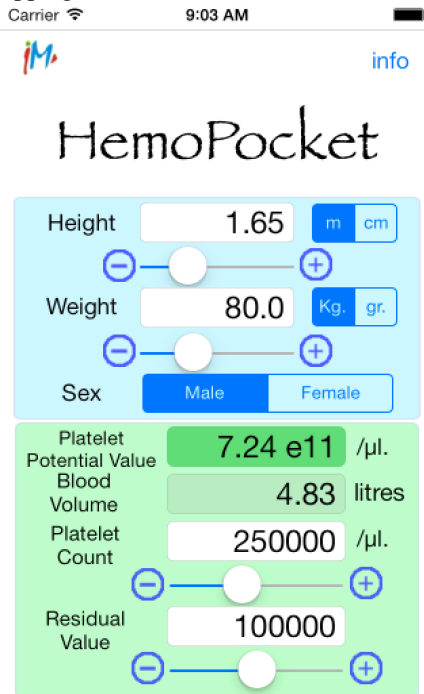


Fig. 1: User interface for iOS device.

B) Green area

Background: platelets are blood cells whose main function is to stop bleeding. In patients that are presumed to be at increased risk for bleeding, it has been standard practice to provide platelet transfusions as supportive care [1]. A pre-donation platelet count is extremely useful to ensure platelet quality and maximize platelet yield per extracted bag [2]

Blood Volume (BV): the app automatically calculates this parameter (Litres) by using Nadler [3] correlation between height, weight and genre of the donor. The value is show in a non-editable textbox.

Platelet Count: is the platelet's concentration of the donor obtained by performing a clinical test. The resulting value can be set in the edit box (platelet/ μ l).

Residual Value: is the recommended platelet concentration that remains after donation. Set the residual platelet value (platelet/ μ l) or stay with the default value (100000 platelet/ μ l) in the corresponding edit box. The user must use the guidelines[4-8] to configurate this parameter.

Platelet Potential Value: HEMOPOCKET©

automatically displays the calculated value. User could take into account this value to optimize the platelet yield in the apheresis process.

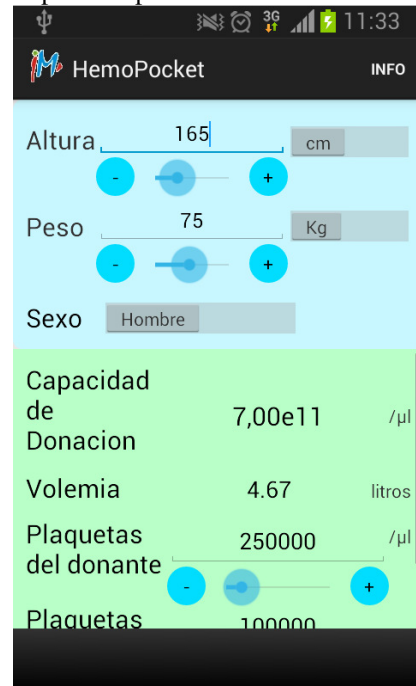


Fig. 2: User interface for Android device.

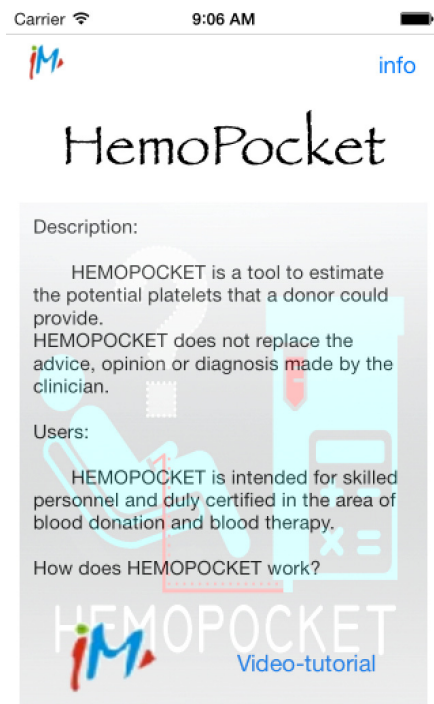


Fig. 3: Info icon support.



Conclusion

HEMOPOCKET© is currently available in English and Spanish, free of charge for iPhone and Android. The potential users are approximately 2000-4000 from around the world. User feedback has been enabled into the app so we could improve app's usability. Meanwhile the HEMOPOCKET© is being used for internal hospital training purposes.

Future works will be focused on offering additional parameters related to calculations of hydric balance to prevent electrolyte disorders or to planify electrolyte replacement. Also, the app will provide quick guidelines about selection criteria for apheresis donation.

Acknowledgement

We thank Sonsoles Guirao for her valuable help in the graphic design of HEMOPOCKET© application.

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