

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



السَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللَّهِ وَبَرَكَاتُهُ

# *ALTERNATIVES TO DONOR BLOOD TRANSFUSION*

*DR. MUHAMMED HASAN AWAD*

## *Autologous Blood Transfusion*

- Autologous blood transfusion is the transfusion of blood into its donor; this may be **preoperative** or **perioperative** .or **intraoperative** and may include blood previously donated or shed blood.
- Such transfusions are used primarily in patients undergoing elective surgical procedures during which it is likely that a transfusion will be required

**It is also used in patients for whom cross-match compatible blood cannot otherwise be made available, as in patients with rare blood groups or with multiple alloantibodies.**

**Interest in and requests for autologous collections increased significantly as a result of the AIDS epidemic because of increased awareness that transfusion-transmitted infections cannot be totally eliminated by donor screening and testing**

# Preoperative Autologous Donation

- Preoperative (predeposit) autologous donation (PAD) is most often used for patients who are likely to require transfusion during elective surgery, and where there is minimal risk to the patient by undergoing this procedure.
- For autologous collections, the donor selection criteria do not apply as stringently.

- significant **cerebral** or **cardiac** disease such as **arrhythmias** or **unstable angina** must be evaluated However, patients with advanced age or before they are enrolled in an autologous transfusion program.
- Children are also eligible for autologous transfusions but the volume of blood and anticoagulant must be adjusted to body weight.
- The eligibility of each patient must be carefully reviewed

- Autologous blood for transfusion during elective surgery can be collected by bleeding the patient on several occasions preoperatively.
- The hemoglobin concentration should be more than **110g/L** before the collection of each unit and the patient/donor should receive iron supplements.

- **Some of the limitations of an autologous transfusion program are the condition of the patient, the storage interval, and the erythropoietic response.**
- **In most instances units of blood are stored in the liquid state for 35 to 42 days.**



- **They may be frozen if a longer interval between donation and surgery is required, but this significantly increases the cost and is not routinely recommended.**

- All autologous collections must be tested for **ABO** group and **Rh** type.
- The units must be labeled For Autologous Use Only.

▶ **Disadvantages;** Autologous transfusions cannot be considered risk-free.

1. Some of the disadvantages of an autologous program include the;
2. Logistics involved in organizing the procedure, collection of autologous blood for questionable indications,
3. The underuse of predeposited autologous blood, and overtransfusion because of availability.

4. The most common reaction is vasovagal in nature and 12% of autologous donors developed **angina** .
5. Another disadvantage is the development of **anemia** as a result of repeated phlebotomy, especially if the last unit of autologous blood is collected less than 15 days preoperatively. The requirement for both autologous and allogeneic blood increases in such patients

- 6. Other disadvantage such as; bacterial contamination,**
- 7. Febrile nonhemolytic transfusion reactions, and volume overload still occur.**
- 8. The possibility of an accident or error such as the transfusion of the wrong unit or an allogeneic unit to the autologous donor/patient has been reported to be as high as 1.2% .**

- 9. The costs and benefits of this program must be addressed, especially at a time when the risks of allogeneic blood transfusion are so low .**
- 10. The indications for autologous transfusion should be better defined in order to provide this important service appropriately.**
- 11. Autologous transfusions are not without complications and are not risk-free.**
- 12. They do play an important role, especially in the younger patient.**

## ▶ **Controversies;**

- I. One area of controversy is the testing of autologous blood donations for infectious markers .**
- II. At present, testing of at least the first donation is required in accordance with FDA regulations if the unit is collected in a blood center.**

**Each hospital can set its own testing guidelines and decide whether blood with a positive infectious marker should be released for transfusion**



- **Crossover:** Autologous blood drawn from a patient/donor can be released for another patient under certain circumstances:
- The patient/donor does not need the unit, the blood meets all medical and laboratory criteria for a volunteer blood donor, and the blood tests negative for infectious markers.

**Erythropoietin:** Erythropoietin has been used :

1. to stimulate red cell production either to increase the number of units that can be collected preoperatively or as an alternative to preoperative collection .
2. Its routine use is not recommended because of the high cost and the waste of autologous blood. It is probably useful only under selected circumstances.

# *Preoperative Hemodilution*

- A second approach to autologous blood transfusion involves the use of immediate preoperative phlebotomy and crystalloid transfusion, thereby hemodiluting the patient and creating a normovolemic anemia .
- This procedure is done in the operating room, under controlled conditions.
- Patients who might not be eligible for the autologous program could benefit from such a procedure.

- The blood collected may be transfused during surgery as required, depending on the intraoperative blood loss.
- It is recommended for use in patients who are expected to lose more than 1 liter of blood and whose hemoglobin is more than 110 g/L. Units can be stored at room temperature for up to 8 hours or at 1 to 6°C for up to 24 hours ;the blood so collected does not undergo any storage-related changes.
- The cost of such a program is significantly less than that of an autologous program.

# ***Intraoperative Autotransfusion***

- **A third approach is the collection and retransfusion of blood lost during intraoperative hemorrhage**
- **This method has become popular with the development of technical devices to facilitate the procedure.**
- **There are two types of devices available: those that collect and wash the blood before reinfusion and those that simply collect the blood.**

- **They are most often used in cardiac and thoracic surgery. Red cells lost during surgery can be collected, filtered, washed, and reinfused.**
- **The salvaged blood contains red cell stroma, free hemoglobin, activated clotting factors, and fibrin degradation products.**

- **The reinfused blood does not appear to cause problems in the recipients, but the exact risk is difficult to define.**
- **It also appears that the risk is not increased in unwashed blood if the volume of blood reinfused is limited to approximately 1 liter.**

- ▶ **However:**there are contraindications to the use of salvaged blood. These include the possibility of bacterial or tumor cell contamination of the operative field.
- ▶ It is also not recommended in patients with sickle cell anemia unless the patient has undergone preoperative red cell exchange transfusion



