SUMMARY

Oxygen is very fundamental to human life and its deprivation leads to death very rapidly. In fact oxygen lack does not only kill human being but wrecks also its machinery. Normally the inspired air contains 20.93% oxygen.

Oxygen is taken from air through respiratory passages by lungs and carried through blood to be distributed to body tissues at the final step. This process can be considered as formed of several steps: oxygen uptake, oxygen carriage, oxygen delivery.

Tissue oxygenation is the final goal of the combined work of both circulation and respiration. The principal function of the heart and lung is to ensure proper tissue oxygenation. This entails supporting O_2 delivery to tissues and CO_2 elimination, going in accordance with the metabolic requirements. This will maintain arterial blood O_2 and CO_2 partial pressures within a narrow range necessary for proper functioning of organs. The respiratory and cardiovascular systems are linked in a way to accomplish the process of proper tissue oxygenation over a wide range of metabolic requirements. the review discussed artificial oxygen carriers as

1. Cell-free hemoglobin solution.

2. Encapsulated hemoglobin cells.

3. Perflurocarbon emulsions.

Free hemoglobin derived from hemolyzed blood has been used as red blood cell substitute for decades. Early investigations have described many adverse effects and problems after the use of hemoglobin solutions as artificial oxygen carriers in humans. to overcome the difficulties hemoglobin has to be modified.

Introducing hemoglobin in to cell-like structures offers a variety of advantages. liposomes microencapsulation of hemoglobin in bi-layered phospholipids and sterols, so called liposomes, results in the formation of artificial red blood cells and improvement of vascular retention time. nano-capsules micro-encapsulation of polymer hemoglobin and enzymes decrease effects of lipids on the RES, avoids peroxidation of lipids and increases stability during storage and after infusion.

Perflurocarbons (PFCs) are synthetic carbonflurine compounds derived from fluorination of cyclic or straight chain hydrocarbons. (PFCs) are able to dissolve large quantities of gases including oxygen and carbon dioxide. since (PFCs) are immiscible in aqueous systems, they have to be emulsified prior to intravenous administration. many farther applications will appear in the near future as:

- They can be used as routine pre-operative blood substitutes, trauma, and infra-operative hemodilution in septic shock.
- Micro-circulatory support and perfusion of ischemic tissues.
- Organs awaiting transplantation have been successfully preserved by perfusion with artificial oxygen carriers.
- In cancer therapy, tumor susceptibility to chemo and radiotherapy is selectively improved by oxygen delivery.
- Perflurocarbons can be used as diagnostic tools to assess tissue oxygenation by magnetic resonance imaging.
- Some Perflurocarbons can also be used as contrast agent in sonography and computed tomography.
- Perflurocarbons have been used for retinal detachment complications, retinal tears and trauma.

- Liquid ventilation with Perflurocarbons improves pulmonary gas exchanges.

So, there are many benefits to the patients for usage of artificial oxygen carriers as:

a. Decrease death and transmission of diseases from blood transfusion.

b. Decrease usage of blood and blood substitutes.

c. Decrease storage of blood.

d. Artificial carriers can be used in patients with allergy from repeated blood transfusion due to presence of antibodies to red blood cell.