

Contrast media (contrast agent)

Contrast media are substances which when used in radiographic imaging increases the contrast between the organ of interest and the surrounding tissues due to high density and high atomic number compared with soft tissues. In another word, contrast media means substance that due to its high absorption of X-rays from the surrounding tissues permit clear demonstration of an organs or tubular structure.

There are two images: in the image shown on the left contrast media is not used therefore large intestine is not appeared whereas in the image shown on the right contrast media is used therefore large intestine is clearly appeared.



Positive contrast media:

- A high atomic number with an increased ability to attenuate X rays.
- e.g – Iodine, Gadolinium.

Iodine: atomic number 53. Which is three times denser than bone, five times denser than soft tissue.

Negative contrast media:

- Attenuate X rays less than the soft tissues of the body because gas contains per unit volume a much lower number of radiation attenuating atoms than the patient's soft tissues.
- e.g – Air, carbon dioxide

- **Iodinated contrast** is a form of intravenous radiocontrast (radiographic dye) containing iodine, which enhances the visibility of vascular structures and organs during radiographic procedures.
- Iodinated contrast media may either be oil-based or water-soluble, the oil-based is slowly absorbed by body tissue while water-soluble iodinated medium is more quickly absorbed.
- Iodinated medium may also be either ionic or non-ionic. The ionic type tends to create a high osmolality in blood and may cause a contrast media reaction in some individuals, which may be life-threatening for those with certain medical conditions.
- when ionic iodinated medium is injected, the molecule begins to dissociate, releasing ionic particles (+ cation and - anion) at a concentration 4 to 8 times higher than the particle content of blood (Osmolality).
- The non-ionic (*not dissociate*) decreases the risk which is found in ionic form, but is much more expensive. The non-ionic contrast media is much more widely used today.

Characteristics of X ray contrast media

- Good radio opacity
- Rapidly and completely absorbed in the body.
- It should not contain any side effects. It should not be toxic and painless to patient and not expensive.
- It should have rapid and complete excretion from the patient's body.
- It should have low viscosity and low osmolality (osmolality means osmoles/Kg of solvent) and osmoles talk about not just what is in the solution but how things can split apart.
- It should be highly water soluble so that it will be excreted fast.
- risks associated with contrast agents have not been eliminated, and adverse reactions of varying degree continue to occur. Consequently, it is imperative for anybody administering contrast agents to be intimately familiar with the characteristics and potential side effects of these agents.