

Positive and negative contrast media



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In the field of radiology, some investigation or procedure on a patient in need of contrast into the patient's body through a vein, artery, mouth or anus, which is located in the body. Since the invention of the era of the 1950s, iodine contrast media (ICM) is apparently more secure have been used extensively, almost daily use and is a widely used drug in medical history. Various forms and types of contrast media was used for the development of medical imaging. Most current diagnostic imaging contrast agents depends on this. Such as pharmaceutical drugs most others, this contrast agent was almost no negative effects even with a good safety record and proven medicine/drug is safe for use.

If seen on x-ray film, there are usually pictures of the anatomy such as bone, and there also appears a white colored gas that surrounds around the organs. The real aim is the use of contrast media to increase the density of the organ is usually not visible on radiographs, such as passage of urine or blood vessels, which originally did not appear at regular chest x-ray contrast media are not used. After application of contrast media, the resulting image will be white showing a hidden organ. Contrast media is composed of two types of ionic and non ionic contrast media is divided into two categories

- Positive contrast media
- Negative contrast media

Positive contrast media

Positive contrast agents are agents that have the atomic mass and a high rate of obstruction (attenuation) high. So these agents are indeed radiopaque material. Positive contrast media are as iodine, bromine, and barium.

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Typically, these materials will be incorporated into the body (according to appropriate procedures) and contrast agents will meet the target organ.

Effects resulting radiopaque would explain the situation and structure of the organ / tissue targeted at radiographic images. Generally, a positive contrast agent is the key to ensuring that the patient has allergies or not for the selection of the contrast media can be tailored to the patient to avoid the effects of anaphylactic shock.

Negative contrast media

One of x-ray absorption is the weight of the atomic mass of a substance. If the atomic mass is low, the effect of obstacles (attenuate) is low and the reverse occurs when the atomic mass increases. When the mass of the atom is high, it will produce an effect of density / contrast radiography of the image because the image will become more permeable and dark. This feature is useful when an anatomical structure is shown with a background of very permeable and the large difference in contrast between the image and the background (without producing blur the boundaries between image and background).

Contrast media such as air (oxygen, carbon dioxide, etc.) are good examples as negative contrast agents. Negative contrast agents often used in conjunction with contrast agents positive and one common procedure often incorporate the use of these agents were negative double barium enema.

Examples of gas used to produce negative contrast in radiographic images:

Carbon dioxide

Produced in the gastrointestinal tract (GIT) with barium sulfate to demonstrate mucosal pattern. Double contrast barium meal for example. Carbon dioxide can also be produced by the colon when given double contrast media, as it reduces pain and reducing stomach discomfort immediately.

Oxygen

Produced in the body cavities such as in the knee when examining arteriogram to demonstrate the knee joint.

Air

Produced by the patient during the radiographic examination, for example, took a deep breath and hold during chest examination.

Basic iodine contrast media

Several investigations in the radiology needs of this contrast into the patient's body through a artery or a vein. A frequent example is the intravenous urogram. Usually only the bones and the wind will be visible on x-ray images. To distinguish the path of blood in the urine or blood vessels, contrast media containing iodine to be added to increase the intensity of blood or urine. Then, this will cause the structure to look 'white' in films such as the bones of patients in x-ray images.

Classification of Contrast Media

There are two parts: the ionic and non ionic.

Ionic compound is divided into two parts; high level of osmolar contrast media(hocm), and low level of osmolar contrast media(locm). This classification is based on the iodine concentration of particles (generally as elements of contrast media is frequently used in the procedure IVU) absorbed / dissolved into the blood. If the rate of absorption of iodine is too high, it can slow the blood flow into the central nervous system (hyperosmolality). This situation is a major factor many negative reactions to patients due to contrast media that are not appropriate.

Agents

Rate of osmolality(mOsm/kg)

High-osmolar contrast media

1800-2100

low-osmolar contrast media

600-850

Non-ionic compounds

300-484

Plasma

280-295

Cerebrospinal Fluids

301

Ionic:

Content molecules tightly to the anion and cation (positive and negative) in the blood causing high osmolality – toxic / reaction high. Properties of molecules containing benzene rings, for example – salt compound meglumine diatrizoate and diatrizoate sodium (Renografin 60 and Hypaque 76 – osmolaliti high)

Characteristics of iodine contrast agents;

- i. Osmolality (no liquid particles in 1 kg of water)
- ii. viscosity – the size of the rejection of (resistant) to the flow of fluids (viscosity / concentration)
- iii. Toxicity – (poisoning / injury), it is based on the molecular configuration.

Non-ionic:

Molecules are not resolved in the fluid / blood. For example, a compound of sodium diatrizoate (iopamidol, isovue, iohexol / omnipaque)

– Measures of care;

- i. Can not exceed the dose.
- ii. Stay away from the sun.
- iii. Stored at room temperature.

Reactions to contrast agents – iodine:

Use of Iodine contrast media (ICM) can cause unwanted side effects and manifestations of anaphylaxis. Symptoms include nausea, vomiting, erythema area, generally a hot sensation, headache, coryza or larynx

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edema, fever, sweating, asthenia, dizziness, paleness, dyspnoea and moderate low blood pressure. more acute reactions in such as vasodilatation cardioasluar system with pronounced peripheral hypotension, tachycardia, dyspnoea, action, bluish skin condition(cynosis) and lack of consciousness, needs emergency treatment. On behalf of this reason the use of contrast media should be limited in cases of diagnostic procedures must be shown. Side effects associated with use of intravascular contrast medium is constant iodinated of natural light to moderate and temporary, and less often by non-ionic than ionic preparations. Side effects to ICM are classified as special and nonidiosyncratic. The pathogenesis of these adverse reactions may involve direct effects of mobile phone; enzyme induction, and activation of quinine, fibrinolytic complement, and other systems.

ATTENTION AND CONTRAST AGENTS CONTROL MEASURES.

Firstly, check the history of the patient. Make sure the reading of the BUN- blood urea nitrogen (8-25mg/dl kretinin) – (0. 6-1. 5 mg / dl). Actions taking steroid / anti-histamine before contrast examination. Check patient heart condition. If the patient have Multiple myeloma or myelo dysplastic syndrome or severe diabetes (preferred drink a lot of water).

Anaphylactic shock.

The other name is Vasogenic shock. Histamine is released in response to an antigen (foreign substance). They give effect to; smooth muscle – causing bronchial spasm (bronchospasm) respiratory (sneezing, wheezing, a pilot). Increased vascular permeability – (urticaria, edema of the mucosa, red spots (rash). Increased secretion of mucous glands (nausea, vomiting).

Sign of the symptom (anaphylactic shock) are patients will begin to be Agitated. Rate of pulse will be increased dramatically. The patient appeared pale and weak and lifeless body. They do not have the ability to think too long. The patient feels cold, sticky and itchy skin. skin of the patient will be reddish and spotted (urticaria). Patient's neck like a choking / strangulation and Trouble breathing.

Mild symptoms

Weak symptoms include the following disease: dispersed urticaria, which is the very commonly stated as adverse reaction; sickness of pruritus; rhinorrhea; brief retching or nausea or vomiting; dizziness, diaphoresis; coughing. Patients with mild symptoms should be noticed about the progression or development of a more severe effect, which needs treatment.

Moderate symptoms

Medium symptoms include the following: constant vomiting; diffuse urticaria; pain in head; facial oedema; laryngeal oedema; weak bronchospasm or difficulty in breathing; palpitations, rapid heart beat (tachycardia), or slowness of heart beat (bradycardia); high blood pressure; and abdominal spasms or cramps.

Severe symptoms

Acute symptoms include the following: life-threatening arrhythmias (in example; ventricular tachycardia), laryngeal oedema, faint, over bronchospasm, pulmonary oedema, spasm, low blood pressure, and death.

Comparison of contrast agents:

Ionic agent

Non-ionic agent

Toxicity – high risk of allergy

Toxicity – less / low risk

ionic

non-ionic

Osmolality high

low Osmolality

High viscosity

low viscosity

Contrast media needed for Radiological examination:

To distinguish the path of blood in the urine or blood vessel, usually just the bones and the air will be visible on x-ray and to improve the density of urine or blood.

Advantages of contrast media:

- easily dissolved.
- Inert
- Provide better mucosal detail
- There is no osmotic effect, so the radio density is long-lasting.
- Cheap

- Relatively delicious

Disadvantages of contrast media:

- Aspiration pneumonia if inhaled.
- If got leakage into the cavity or organs of the body. It can't survive indefinitely and may cause granulomatous reactions.

Contrast media management

Reactions that occur while the procedure of contrast media are not predictable, and the patient should be observed carefully during the procedure. The following is general advice to be given by an x-ray contrast media as well as introduced to the patient.

- explain to the patient about the procedure in detail
- the patient and medical history
- approved by completing the patient consent form
- check the serial number or code and expiry date of contrast material
- free virus check on each appliance and packaging that will be used
- ensure that emergency equipment used are provided
- patients are encouraged to drink plenty of water and make sure the patient's body dehydration. Most of the contrast media will be out through the urine after four hours
- make sure the contrast agent used was based on body temperature
- need to take special protection and be alert of additional risks that can be derived as severe cardiovascular disease, severe renal impairment, asthma or a history of allergies, suspected a high sensitivity of iodine, a very old (> 65 years) and very young (<6 months) , severe

respiratory diseases, diabetes and had suffered a reaction to the medication.