J) Blood and Bone Marrow

Spleen Scintigraphy using $^{99m}$Tc labelled heated Red Cell

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Spleen scintigraphy using $^{99m}$Tc was first reported by Fisher et al. and recently, further improvement of its techniques were made by Eckelman et al. However, good results of spleen scintigraphy could not be obtained sometimes by these techniques.

A further investigation was performed in order to get better spleen scintigraphy and the scintigram by our techniques was compared with that of $^{51}$Cr techniques.

Thirty minutes of incubation of $^{99m}$TcO$_4$ to 10 ml of ACD added blood is most stable for labelling. 0.1 mg of stannous chloride is used for fixation of $^{99m}$Tc to red cell because large amount of SnCl$_2$ damages the $^{99m}$Tc labelled red cell excessively for spleen scanning. Osmotic fragility of $^{99m}$Tc labelled red cell dose not be decreased by adding SnCl$_2$.

By Eckelman's procedure using 2 mg of SnCl$_2$ to 10 ml of blood, clear spleen scintigraphy dose not be obtained suggesting to be given not enough damage for red cell. Twenty minutes of heating to saline suspension of red cell after the adding of 0.1 mg of SnCl$_2$ (McRea et al.) gives excessive strong damage for labelled red cell.

The most suitable damage for spleen scanning can be given by the following procedure.

1) Eight ml blood is taken from patient's cubital vein by syringe which contains 2 ml of ACD solution.
2) Sample is centrifuged and separated to plasma and red cell.
3) The red cell is washed twice by saline solution. The plasma is kept under aseptic condition.
4) 0.1 ml of $^{99m}$TcO$_4$ is added to washed red cell and is incubated at 37°C for 30 minutes.
5) Ten µg of SnCl$_2$ is added to the sample and kept stand at room temperature for 15 minutes.
6) The sample is washed twice by saline and resuspended to the stored plasma.
7) The plasma suspension is heated at 49 ± 0.5°C for 7–10 minutes.
8) After cooling the sample is injected to the patient and 30 minutes after the injection, spleen scanning is started.

The spleen scintigraphy obtained by this $^{99m}$Tc technique is adequate to describing the shape in detail. However, this scintigraphy expresses rather sectional image of the spleen compare with that obtained by $^{51}$Cr technique.

The labelling process is quite complicated and it takes 2 hours for preparation. Also, adequate scanning time is limited because elution of $^{99m}$Tc from the spleen is relatively rapid. But spleen scintigram by this method expresses good shape of the spleen in detail and radiation dose for spleen is less than that of $^{51}$Cr labelled red cell method.