IMPROVEMENT OF PANCREATIC IMAGING

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In the pancreas image study with the scintillation camera utilizing ^{75}Se-selenomethionine, optimal separation of pancreatic and hepatic images is achieved by examining the patient while he is lying on his right side with the detector head adjusted in an anterior oblique position, being tilted 10 deg cephalad as well as 10 deg toward the right side of the patient. Elevation of the pelvis on a pillow further accentuates this separation.

Pancreas scintiphotography is usually performed from the anterior projection with the patient in the supine position. When the inferior border of the liver extends far below the costal margin, it becomes difficult or impossible to delineate the pancreatic from the hepatic activity since both organs concentrate the ^{75}Se-selenomethionine. Previous approaches toward overcoming this problem included placing the patient in the left anterior oblique position (*1*), angling the detector cephalad (*2*), or subtraction of the liver image by special electronic equipment (*3*).

This study was performed to determine the most effective technique for obtaining optimal separation of the pancreatic and hepatic images using the scintillation camera.

METHODS

To each of eight patients referred for pancreas scanning, ^{99m}Tc-sulfur colloid was administered intravenously. Fifteen to 30 min later intravenous ^{75}Se-selenomethionine was given and the pancreas imaging was started immediately afterward. Six 10-min images were obtained sequentially using Polaroid film. During the procedure, multiple positions were used. These were Position 1 (patient supine) in addition to either Position 2 (patient placed on right side) and/or Position 3 (on right side with pelvis elevated on a pillow). In all positions, the relationship of the collimated head of the scintillation camera to the body was kept constant. It was adjusted 10 deg cephalad as well as 10 deg toward the right side of the patient. At any single position, a corresponding liver image was obtained by adjusting the

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FIG. 1. Pancreas images 1A, 1B, and 1C obtained in Case 5 in Positions 1, 2, and 3, respectively.

FIG. 2. Corresponding liver images 2A, 2B, and 2C obtained in same patient in Positions 1, 2, and 3, respectively.

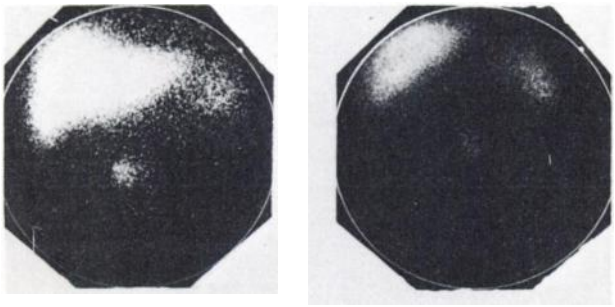

FIG. 3. Anterior liver images with a radioactive marker fixed in place on midline of the back, obtained in Position 1 (left) and Position 2 (right).

TABLE 1. QUALITY OF SEPARATION OF PANCREATIC AND HEPATIC IMAGES

Case No.	Position 1	Position 2	Position 3
1	Pancreas image hidden	Not employed	Images separate
2	Pancreas image hidden	Not employed	Images contiguous
3	Images contiguous	Separate	Not employed
4, 5	Images contiguous	Wide separation	Wider separation
6, 7, 8	Images separate	Wider separation	Not employed

pulse-height analyzer to accept the ^{99m}Tc photopeak energy.

The changes in the spatial relationships of the liver were analyzed when patients were moved from Position 1 to Position 2 by obtaining anterior liver images after placing a radioactive marker (^{99m}Tc-pertechnetate) on the midline of the back, fixed in place at the level of the second lumbar vertebra.

RESULTS

The quality of separation of pancreatic and hepatic images in the three positions is detailed in Table 1.

The improvement in pancreas imaging in the example of Case 5 is illustrated in Fig. 1A, 1B, and 1C, obtained in Positions 1, 2, and 3, respectively. Figures 2A, 2B, and 2C are those of the corresponding liver images (with ^{99m}Tc-sulfur colloid).

Figures 3A and 3B show the anterior liver views with the marker fixed in place on the midline of the back, taken in Positions 1 and 2, respectively. As the patient was turned to the right side, the liver shifted upward and to the right (and the spleen moved downward and medially).

DISCUSSION

The mobility of the scintillation camera permits examination of the pancreas from the anterior projection with the patient in different positions. As the liver moves upwards and to the right when the patient is turned from the supine position to the right side, increased anatomical separation between the two organs results. When the detector head is also adjusted to provide the best viewing angle of the subhepatic space, the maximum possible image separation of the two organs is achieved.

The change in the shape of the pancreas with posture (Figs. 1A, 1B, and 1C) should not interfere with the validity of interpretation. This change in shape is probably brought about by the following factors: (A) the pancreas is surrounded by adipose tissue which allows some mobility; (B) the tail of the pancreas reaches the splenic hilum and it is conceivable that when this moves with changing posture, the pancreas will follow it to some degree; (C) the mesentery of the transverse colon is attached to the peritoneal covering of the pancreas; the dependent transverse colon may pull on its mesentery and hence on the pancreas; (D) when a pillow is placed under the pelvis while the patient is on the right side, some distortion of the trunk occurs altering the shape of the pancreas. If it is anticipated that the pancreas image may be masked by that of the liver or this situation arises during the scintigraphic examination, the right-sided positions should be used.

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