

CASE REPORT

Sequential Scintiangiography of the Hepato-Splenic System of Xiphopagus Conjoined Twins

Donald Margouleff, Rita G. Harper, Kenneth Kenigsberg, David Horn, and Concepcion G. Sia,

North Shore University Hospital, Manhasset, New York and Cornell University Medical College, New York, New York

Scintiangiography of xiphopagus conjoined twins following sequential i.v. injection of Tc-99m sulfur colloid revealed the size, configuration, and anatomic point of fusion of the twins' common liver prior to surgery. Cross circulation was determined to be non-significant by this approach. The technique is presented, compared to other methods, and the benefit of sequential hepatic scintiangiography for xiphopagus conjoined twins is reviewed.

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Hepatic fusion is present in 81% of xiphopagus conjoined twins (unpublished data) and is the major obstacle to surgical separation. To determine if this surgical impediment were present, a scintiangiographic technique was devised that demonstrated the hepatic configuration and vascular supply in premature, 1690-g, xiphopagus conjoined twins transferred to our institution. The use of Tc-99m sulfur colloid proved to be an effective procedure for this purpose.

MATERIALS AND METHODS

The xiphopagus conjoined twins (Fig. 1) were connected from the xiphoid process of the sternum to the umbilicus. At the time of diagnostic evaluation their combined birth weight was 6380 g and they were 4 1/2 mo of age. Hepatic tissue was palpable in the connecting bridge, neither twin was jaundiced, and both had normal, equally pigmented stools. Gastrointestinal series with barium revealed normal, separate tracts.

The pliability of the connecting bridge enabled positioning of the twins in a longitudinal orientation for the radionuclide study. Technetium-99m sulfur colloid was administered to Twin A via a previously placed intravenous line. Sequential imaging was obtained at 3-sec intervals for 3 min. Ten minutes later, Twin B was injected with the same amount of radiocolloid. No significant hepatic uptake of Tc-99m was noted in Twin B until the second i.v. injection. Static images were taken at various angles. Radiation exposure per twin was calculated to be 0.6 rad for total body, 1.0 rad for liver and spleen, 0.16 rad for the bone marrow, and 0.016 rad for the ovaries.

RESULTS

The injection of Twin A revealed an identifiable spleen and a



FIG. 1. Premature xiphopagus conjoined twins on admission to North Shore University Hospital at 4 hr of age. Combined birthweight 1690 g.

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For reprints contact: Rita G. Harper, North Shore University Hospital, 300 Community Dr., Manhasset, NY 11030.

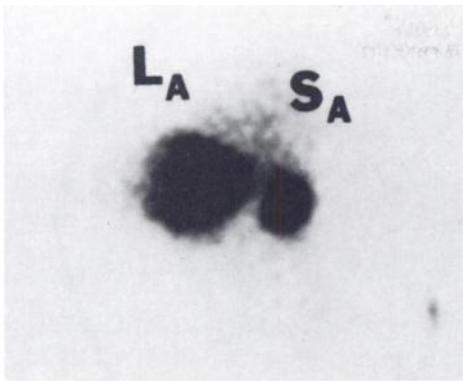


FIG. 2. Anterior projection of liver and spleen of Twin A. Organs appear normal in size and configuration. Twin B is within view of gamma camera but there is no appreciable uptake of tracer by Twin B's liver and spleen.

liver of normal configuration (Fig. 2). The liver of Twin A appeared to be entirely within her abdomen. There was no simultaneous uptake of the radiopharmaceutical in Twin B's liver. The second injection (that given to Twin B) revealed the left lobe of Twin B's liver extending into the connecting bridge and adhering to the lateral margin of the right lobe of Twin A's liver (Fig. 3). The spleen of Twin B could not be distinguished. By placing a marker over the bridge, it was possible to make an accurate estimate of the point of juncture of the two livers.

DISCUSSION

Sequential hepatic scintiangiography demonstrated that: (a) each infant possessed an intact liver; (b) the liver of Twin B was present within the connecting bridge; (c) the livers were fused and the point of juncture was determined; (d) there was no significant cross circulation since Twin B's liver was not visualized following the injection of Twin A; and (e) the spleen of Twin B was not demonstrated by this technique.

Since the uptake of the Tc-99m sulfur colloid by the reticulo-endothelial system is dependent on blood flow, had cross circulation been present, its extent would have been reflected by the relative uptake of the liver and spleen of the injected and contralateral twin during the initial injection. A computer analysis of cross circulation would then have been undertaken to determine the degree of vascular connection. Nonvisualization of the spleen in Twin B was thought to be due either to the superimposition of the images of the left lobe of the liver and the spleen or absence of a spleen in Twin B. The first possibility was confirmed at surgery.

Three alternative methods to define the twin's hepatic configuration and vascular supply were considered in lieu of scintiangiographic imaging. Intravenous cholangiography, reported by four previous authors (1-4), was not attempted because of the possible sensitivity to the radiographic contrast medium and the inability of the technique to outline more than the biliary tree and gallbladder. Iodine-131 rose bengal, reported by Upadhyaya (3), was rejected because of its long residence time and high radiation dose of iodine as well as its limited image resolution secondary to restricted radiant change (5). Umbilical vein angiography reported by Kling (4), was rejected because of its invasive nature and possible surgical and infectious hazards.

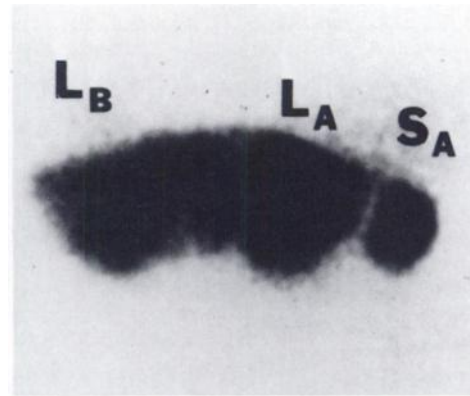


FIG. 3. Twin B injected with Tc-99m sulfur colloid 10 min after initial injection of Twin A. Liver of Twin B lies within connecting bridge and adherent to right lobe of Twin A's liver.

Technetium-99m administered intravenously and simultaneously to both infants was reported by Cywes (6). The technique reported by Cywes only demonstrates a lateral view of two livers with a connecting bridge, while the sequential technique reported herein demonstrates the point of fusion as well as the quantity of cross circulation in a supine-longitudinal position.

In summary, a sequential scintiangiography technique using Tc-99m sulfur colloid has been described for the delineation of the size, configuration, anatomic point of fusion, and quantity of cross circulation in xiphopagus conjoined twins. Radiation exposure is less than that required for a chest x-ray.

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