HH size (cm)	<1 (n=6)	1−1.9 (n=15)	2−2.9 (n=12)	≥3 (n=15)
planar	0%	20%	67%	93%
3H-SPECT	17%	80%	100%	100%

The overall Se of planar and 3H-SPECT was 52% and 83%, respectively. The smallest HH detected by 3H-SPECT was 0.9 cm while the largest HH that was not detected by 3H-SPECT was 1.4 cm (therefore, Se=100% for HH>1.4 cm). The Se of 3H-SPECT for HH (0.9~1.4 cm) was 43% (3/7). None of 25 NH was positive on either planar or SPECT imaging (specificity=100%).

In summary, our results are in close agreement with that reported by Ziessman et al (JNM 32:2086): Se is comparable despite a shorter acquisition time (20 min vs. 26.7 min). 3H-SPECT improves the Se of ^{99m}Tc RBC scan for detecting small HH without decreasing the specificity, and appears to be the procedure of choice for confirming the diagnosis of HH for lesions larger than 1.4 cm which are detected first on other imaging.

25. Hepatic-Arterial Flow Study and SPECT using ^{99m}Tc MAA in Embolized and Nonembolized Hepatocellular Carcinoma

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To compare the density of the functional microcirculation of hepatocellular carcinoma (HCC) with normal liver and to investigate the effect of hepatic-arterial oily chemoembolization (HAE).

Five HCC were proven by biopsy, and the rest clinically and radiologically. HAE were performed superselectively in five patients (all with nodular HCC) and HAA in the other three patients (nodular, multinodular and diffuse infiltrating HCC respectively). Each examination was performed within 1 hour following either hepatic arterial angiography (HAA) or HAE procedures on eight patients. The mixture of 2 cc normal saline and two to three mCi of ^{99m}Tc MAA was infused through a catheter. Sixty consecutive images were obtained for a flow study within a minute, and static images and SPECT followed by. We compared these radionuclide examinations with angiogram and computered tomography findings.

In the three patients who underwent HAA alone, radioactivity was markedly increased in tumors than in extratumoral liver after infusion of ^{99m}Tc MAA into hepatic-arterial catheter and the ratio of tumoral and extratumoral uptake (T/E ratio) were 6.5 or more (mean: 12.5). In four of the five patients who underwent HAE, T/E ratio were remarkably decreased (0.5~1.3) and reflux of radiotracer into the nonembolized hepatic segments were found. Embolized areas were better delineated in the radionuclide study than in HAA. In the other one who underwent partial embolization, antegrade flow into tumor site and strong radiouptake in the tumor was disclosed (T/E ratio: 7.0).

Hepatic-arterial flow study and SPECT using ^{99m}Tc MAA ia a valuable method to assess the embolization effect in HCC.

26. 정상인에서 지방식 투여와 CCK 연속주입에 의한 담낭수축의 비교 연구

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담낭 수축의 정량적인 평가를 위해서는 지방식의 경구 투여나 cholecystokinin (CCK)의 주입이 이용되어 왔으나 현재까지 담낭자극제의 투여방법 및 담낭 박출계수 (GBEF)의 정상범위가 정립되지 않은 상태이다. 최근 보고에 따르면 CCK의 투여방법에 있어서는 연속주입이

더 재현성이 높고, 최대 GBEF가 커서 bolus 주입보다 유용하다고 알려지고 있다. 이에 연자들은 정상인에서 ^{99m}Tc-DISIDA scan을 시행하여 지방식 투여와 CCK 연속주입 후에 GBEF를 구하여 두 방법의 유용성을 비교하였다.

대상은 상복부 동통이나 담석증의 과거력이 없는 정상성인 지원자 22명으로 이들은 모두 지방식 투여후에 GBEF를 구하였고, 이들 중 8명은 지방식 투여에 의한 검사를 반복하였으며, 다시 이들 중 7명은 CCK 연속주입법에 의한 검사를 2번 더 반복시행하였다. 지방식 투여에 의한 정량적검사는 공복시 ^{99m}Tc-DISIDA를 2 mCi 주사하고 90분 후에 달걀 노른자 2개와 우유 200 ml를 섞은 지방식(386 Kcal)을 섭취시키고 섭취전과 섭취후 30분, 60분에 담낭방사능치를 얻어 GBEF를 구하였다. CCK 연속주입법에 의한 정량적 검사는 공복시 ^{99m}Tc-DISIDA를 2 mCi 주사후 90분 부터 CCK(Sincalid®, Kinevac)를 20 ng/kg/hr의 일정속도로 infusion pump를 이용하여 45분간 연속적으로 정맥주입하면서 담낭의 시간 방사능곡선을 구하고, 이로부터 최대 GBEF를 측정하였다. 결과는 다음과 같다.

1) 정상성인 22명에서 지방식 투여 후 60분의 GBEF는 90.4±8.47(mean±SD)%였고, 각 사람간의 측정치에 유의한 차이는 없었다.

2) 정상성인 7명에서 CCK 연속 주입후의 최대 GBEF는 62.4±16.6%였고, 각 사람간의 측정치에 통계적으로 유의한 차이가 있었다($p<0.05$).

3) 각 방법의 재현성을 평가하기 위하여 지방식을 투여하여 반복 검사한 8명에서 측정내 분산은 95.1이고 변이계수는 11%이며, CCK 연속주입으로 반복검사한 7명에서의 측정내 분산은 275.4이고, 변이계수는 26%로 지방식 투여가 CCK 연속주입에 비하여 재현성이 높았으나 통계적으로 유의하지는 않았다($0.05<p<0.1$).

4) 지방식을 투여하여 반복시행한 7명의 GBEF는 86.1±10.3%이고, CCK를 연속 주입하여 반복시행한 GBEF는 62.4±16.6%로 지방식을 투여하였을 때의 GBEF가 통계적으로 유의하게 높았다($p<0.05$).

이상의 결과로 보아 지방식의 투여가 CCK 연속주입 방법에 비하여 담낭수축을 정량적으로 평가하는데 있어서 더 재현성이 크고, 정상개체간의 차이가 없으며, GBEF가 유의하게 높으므로 보다 유용한 방법으로 사료된다. 향후 이를 이용하여 담당 운동성이 감소한 환자군에서의 전향적인 연구가 필요할 것으로 생각된다.

27. Pulmonary Embolism in Childhood Minimal Change Nephrotic Syndrome

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We have investigated the incidence and precipitating factors of pulmonary embolism in childhood minimal change nephrotic syndrome. The ^{99m}Tc-MAA lung perfusion scan and biochemical studies were performed in 14 children with steroid responsive minimal change nephrotic syndrome. Five patients were found to have perfusion defect consistent with pulmonary embolism (35.7%). But they had minimal or no respiratory symptoms and signs. In our biochemical studies, the mean proteinuria on admission was 676±31 mg/m^2/hr in the group with pulmonary embolism, and 313±28 mg/m^2/hr in the group without pulmonary embolism. The mean platelet count at early stage of clinical response was 746,600±28,000/mm^3 in the group with pulmonary embolism, and 511,000±9,000/mm^3 in the group without pulmonary embolism. Other biochemical and hematologic findings include serum albumin, cholesterol, triglyceride and hematocrit values were not significantly correlated. All cases of pulmonary embolism were treated with dipyridamole (5 mg/kg). Four cases were improved in two weeks. However one showed persistent multiple perfusion defects after one month.

Our study suggested that pulmonary embolism might be one of the major complications in childhood minimal change nephrotic syndrome. Their occurrences were significantly correlated with the proteinuria level at symptom onset and the platelet count at initial stage of response by steroid therapy.