The Korean Journal of Nuclear Medicine
Vol. 19, No. 1, May, 1985

# PEDIATRIC NUCLEAR CARDIOLOGY : CURRENT TRENDS IN A DEVELOPING TROPICAL COUNTRY

**Homai DaCosta. B Bagwe, B Ahire., A Sewatkar**

*Department of Nuclear Medicine, Breach Candy Hospital & Research Centre.*
*B. Desai Road, Bombay 400 026. India.*

## Introduction

Perusal of the symposium program revealed the possibility that the major aspects of Paediatric Nuclear Cardiology as practised currently, might be covered by certain of the preceeding speakers. First pass study could sweep through the chapter on shunts, while ventriculography could include childhood conditions assessed pre-and post-operatively. Consequently, I was left with only two options. Either to bore you with repetition, or to take you along less frequented pathways and hope that you may not find them less enchanting. I have selected the second alternative.

The subject matter will be divided into two sections and pertinent points will be clarified with patient examples.

## Instrumentation and Modus Operandi

The Nuclear Medicine Department of a developing country may possess only one scinticamera and its detector-head may be so large that even a 6 month infant's jugular vein may lie too far away from the injector's field of visual acuity: nor can the situation be improved upon with the computer operating at 3.0 zoom. But the jugular injection yields the best bolus at the worst of times just as the cubital route yields the worst bolus at the best of times. We are, therefore, frequently, left to compromise with a malleolar vein injection. Fortunately, this has certain inherent advantages. For example, the oncoming bolus of radionuclide leaves the thoracic cavity clear for the appreciation of minor, unexpected deviations. Furthermore, we have a fleet of cardiologists who perform angiograms, but who wish to elicit in advance, the side of the body on which the inferior vena cava (I.V.C.) lies, the existence or absence of situs inversus, polysplenism and a central, bilobed liver. These queries can be answered economically by injecting 1-2 mCi Technetium-99m phytate in a malleolar vein with the infant positioned supine under the detector-head and the camera programmed for sequential imaging. Since the iliac vein and a contralateral inferior vena cava make an undisputed angle between themselves, we do not consider it necessary to inject both malleolars simultaneously; the technical feat would mar the simplicity of a routine procedure without contributing to diagnostics.

With respect to gated studies, I merely with to emphasise that the small chest wall of the child combines with the frequently dextroposed or anomalous ventricle, to render difficult the adjustment of the detector-head, especially if the crystal is a large one. However, this problem can be overcome with care and patience in each individual case instead of adhering to stipulated, predetermined, angulations.

**Patient Approach**

1) The anomaly which is to be subjected to surgical intervention requires detailed anatomic information, such as is available only with the exquisite resolution of a contrast angiogram. However, the cardiac surgeon may initially desire non-invasive screening of an acutely ill-neonate and Nuclear Medicine technology has frequently proved superior to echocardiography in this respect. But this aspect of Paediatric Nuclear Cardiology may be discussed by the speaker of the First pass study.

2) Congenital cardio-vascular anomalies are not a static group of lesions which are only, or always, manifested during childhood; nor is a remedial measure presently available for every abnormality. For example, congenital primary pulmonary hypertension may pass silently into adulthood, while non-development of an unilateral pulmonary artery can permit an uneventful longevity into the eighth decade. Invasive investigations have been known to precipitate a catastrophy in such patients, but fortunately, both groups lend themselves to radionuclide diagnosis, provided the dynanic phase is recorded at the time of the lung scan.

3) Nuclear Medicine lends itself superbly to the diagnosis of diaphragmatic hernias, so every child with a para-cardiac radiological opacity is first referred for a hepatosplenic scan. However, every para-cardiac opacity is not a herniated organ and the Nuclear Physician who routinely submits a liver scan patient to a dynamic study may unsuspectingly encounter a left ventricular aneurysm, a pulmonary haemangioma or a neoplams. Consequently, the procedure enables him to forward some useful, positive information to the referring physician or surgeon.

4) It is important to realise that a patient may present for a scan of a suffering target organ such as the brain, while the cardio-vascular anomaly responsible for it remains clinically silent, as when the aortic arch is absent. Yet, this mishap may be well delineated if a cerebral angiogram precedes every brain scan, because a good compact bolus combines with the rapid transit time of an infant to give pictorial clarity at each circulatory phase, provided the crystal is not unduly saturated with a needless amount of radioactivity.

5) Presence of congenital membrane across the lumen of the termination of the inferior vena cava causes ascites. Since hepatic disorders are more frequent causes of ascites in the Indian Paediatric and adult populations, such patients are invariably referred for a radiocolloid scan. The routine malleolar vein injection with a dynamic study preceeding the static scan can unmask such a pathology non-invasively and immediately. Analyses of our data reveals that whereas the children with this anomaly seek medical aid for discomfort due to gross ascites,

those who enter adulthood without any surgical correction are disturbed primarily by the enlarged collateral channels evident on their abdominal wall. Scintigraphy offers an explanation for this: the bolus transit-time is markedly prolonged in the infant whose venous alternates have narrower lumen.

6) No talk of Paediatric Nuclear Cardiology from a developing country is complete without a discussion of pericardial effusion. In this particular instance it was interesting that this afebrile 4 year old boy's liver SPECT sections did not reveal an abscess, the pericardial fluid was "anchovy sauce" in appearance, its routine culture grew no organism, indirect haemagglutination test for amoebeasis was negative, and radionuclide ventriculography implied myocarditis while there was no clinical evidence of endocarditis.

## Summary

We conclude that Nuclear Medicine technology has much to offer in the diagnosis of cardiovascular pathologies. Its potentials have yet to be fully appreciated by those who have access to the facility, as also by those who practise this speciality with resigned pessimism.