contralateral side even when there was no macroscopic evidence of brain ischemia.

Moreover, Zouakia et al. (3) confirmed the effect of early hypoxic-ischemic injury on D2 receptor status, as proposed by Kapucu et al. (1), even when no brain lesion was detected on MRI. This result suggests a long-term deleterious effect of hypoxic-ischemic injury on D2 receptors, still detectable up to 8 mo old, and could guide the therapeutic approach (drugs, physiotherapy, and others) as early as the critical neonatal period.

REFERENCES

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REPLY: In their letter, Tranquart et al. report the results of their dopamine D2 receptor imaging study that was performed on seven 1-wk-old neonates with hypoxic-ischemic brain injury. These neonates had no brain lesions detected on MRI. 123I-iodobenzamide (IBZM) scintigraphy revealed lower uptake in basal ganglia as the severity of injury increased according to Sarnat and Sarnat score.

In a previous study that was performed on older infants (7.8 ± 2.3 mo) with hypoxic-ischemic brain injury, we had shown that striatal D2 receptor density was inversely related to the degree of brain injury (1). We had also shown that striatal D2 receptor density was higher in infants who had recovered without neurologic deficit compared with those who had neurologic sequelae. Therefore, the results of Tranquart et al. are in accordance with and complementary to our findings.

The two studies highlight the importance of 123I-IBZM brain SPECT in detecting the deleterious effects of hypoxic-ischemic brain injury when no brain lesion is detected on conventional MRI studies.

A follow-up study on these newborns would be interesting to see if any of them eventually show signs of neurologic recovery. It may be expected that neurologic recovery will be associated with a higher D2 receptor density in the basal ganglia. If this happens to be the case, D2 receptor imaging can be useful as a prognostic indicator and a guidance to therapeutic approach.

To minimize the radioactivity received by these infants, we would suggest that a lower dose (11 MBq) of 123I-IBZM be used, which would still allow for good quality imaging.

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Direct and Indirect Radionuclide Cystography: Dosimetry in Children

TO THE EDITOR: We believe that the nuclear medicine community welcomes useful guidelines for radionuclide investigations that have been published in the Journal of Nuclear Medicine and also as a manual (1). We would like to comment on the topic of radiation dosimetry in the guideline for direct radionuclide cystography (DRC) and indirect (IRC) radionuclide cystography in children (2).

We wish to note that in Table 1 of the article by Mandell et al. (2), second column, the unit for the administered activity of radiopharmaceuticals for DRC is erroneously given as MBq/kg (mCi/kg); it should be MBq (mCi).

The value of 0.0024 mSv/MBq from 99mTc-pertechnetate for a 5-y-old child in Table 1 (2) is denoted as the effective dose but, in fact, it is the effective dose equivalent as taken from Stabin's book chapter (3). The effective dose from 99mTc-pertechnetate for DRC recently calculated by Stabin and Gelfand (4) is 0.002 mSv/MBq, which is about 15% lower than the value given in Table 1. Similar and even larger differences between effective dose and effective dose equivalent are typical for most radiopharmaceuticals. Confusion between the terms "effective dose" and "effective dose equivalent" can be found in other radiation dosimetry tables, including those in the Procedure Guidelines manual (1).

Stabin's calculation (3) (of the urinary bladder wall dose of 0.028 mGy/MBq) from DRC in Table 1 is based on the static urinary bladder model with a volume of 65 mL and the assumption of a 15-min residence time of the radiopharmaceutical in this organ. The application of the formula (age in years + 2) × 30 mL (2) gives a bladder volume of 210 mL in a 5-y-old child. The residence time, as well as electron and photon doses to the wall of the bladder with a volume of 210 mL, can be expected to be lower than that for a bladder volume of 65 mL. According to Stabin and Gelfand's estimate (4), reduction by a factor of 2 for the total dose might be a reasonable approximation; in Table 1 the urinary bladder wall dose should be about 0.014 mGy/MBq instead of 0.028 mGy/MBq. The effective dose from DRC of 0.002 mSv/MBq should be reduced in approximately the same proportion to 0.001 mSv/MBq.

Dimitriou et al. (5) estimated a somewhat lower urinary bladder wall dose from DRC of 0.0094 mGy/MBq, calculated for a 7-min bladder filling time in 5-y-old child. They assumed that all of the activity injected into the catheter was situated in the bladder during the entire filling phase. A delay time of 0.5 min between initiation of saline flow and radionuclide injection was also assumed.

Stabin's data on radiation burden from DRC, modified as shown above, are in relatively good agreement with those of Dimitriou et al. (5), in spite of the fact that different methods were used for the calculation.

LETTERS TO THE EDITOR 2127