202 H. Schedewie, A. Seifen*, J. Elders, D. Williams*
UAMS, Dept. Pediat., Anesthesiol. Little Rock, AR.
Endocrine functions during cardiac surgery in hypothermia.

Hyperglycemia and hypocalcemia frequently complicate open heart surgery (OHS) in hypothermia (HOTH). We have studied 21 children (6 wks-6yrs) before, during, and after OHS in HOTH and determined serum glucose (G), insulin (IN), growth hormone (GH), calcium (Ca), calcitonin (CT), and thyroid hormone concentrations:

	Baseline	Cooling	Pre-Arrest	Re-Warming	Normothermia	1 hour off pump
Temp., °C	37°	23°	15°	23°	37°	37°
G(mg/dl)	120	165	185	265	180	175
IN(uU/ml)	18	20	15	18	57	25
GH(ng/ml)	10	22	21	45	65	5
Ca(mg/dl)	9.1	8.3	7.0	7.8	10.0	10.5
CT(pg/ml)	21	15	18	25	17	18

IN conc. were suppressed during HOTH with an attendant increase in serum G. IN rebounded rapidly but transiently during rewarming. Ca declined during HOTH and increased only after Ca infusion during rewarming. CT showed no variation with changing body temp. GH increased with HOTH and during post-arrest rewarming, but returned to normal within one hour of surgery. RIA-T4 and T3 decreased markedly with HOTH, partly because of diminished TBG binding. TSH showed a decrease rather than the expected increase with cooling. CONCLUSION: OHS in HOTH is associated with profound endocrine changes. Their understanding is essential to improvement of management and surgical outcome.

203 J. SACK, H. BLAU*, Z. BAR-ON* and D. KATZNELSON*, Sheba Medical Center, Israel.
Thyroid function in cystic fibrosis (CF) patients compared with healthy Israeli children.

In order to investigate whether the thyroid gland, an organ of endodermal origin, is affected in CF, thyroid metabolism was investigated in CF patients ranging in age from 1 to 20 years.

Serum T4, T3, TSH, rT3 conc. as well as T3 in vitro uptake % were compared to the values elicited in a large group of healthy Israeli children in the same age range.

The mean serum T4 conc. in CF patients (n=24) was 8.7 ± 0.3 µg/dl (mean±SEM), and thus was not different from the mean of 8.8 ± 0.1 in the normals (n=261). Serum T3 conc. were 170 ± 7 ng/dl compared to 166 ± 2 (n=213). The mean serum TSH (n=21) of 5.0 ± 0.5 µU/ml and the mean T3 U% (n=12) of 25 ± 0.9 were not different from the normals. However, the mean rT3 conc. of 44 ± 6.6 ng/dl (n=12) was significantly ($p<0.005$) higher than the mean of 17 ± 2.3 (n=20) in the normal children. There was no correlation between the percentile for weight or the severity of the disease as represented by the Shwachman score and the thyroid function.

Conclusion: There is apparently no disturbance of the hypothalamic-pituitary-thyroid axis nor in the thyroid binding in the serum of CF patients. The peripheral conversion of T4 to T3 is normal. The increase in rT3 conc. in CF patients suggests that this is not due to malnutrition alone and might be due to chronic hypoxia.

204 J. SACK, Z. KRAIEM*, M. BRISH*, M. SHEINFELD*, Sheba Medical Center and Carmel Hospital, Israel.
Cortisol concentrations in prematures and fullterm newborns.

Our recently developed method for the RIA of cortisol in heel-rick blood spots collected on filter paper enabled us to determine cortisol concentrations in premature (PM) and fullterm (FT) newborns.

Cortisol conc, (µg/dl) in PM 30' and 60' after birth were (mean±SEM,n): 21.7 ± 2.7 (8) 22.5 ± 3.8 (8), respectively and declined to 12.7 ± 1.5 (10) at 24 hours. At the age of 2 months, the levels were 8.0 ± 0.4 (9). In FT, cortisol conc. at 3,6,12,20,24,45 and 72 hours were: 11.2 ± 1.5 (5), 11.1 ± 2.6 (5), 12.5 ± 1.4 (4), 12.6 ± 2.8 (5), 10.4 ± 1.7 (14), 10.8 ± 1.2 (8) and 8.2 ± 0.8 (7).

The data suggest that: 1. The PM group responds to birth with increased cortisol conc. which declined 24 hours later; 2. In the FT group, cortisol conc. at 3 hours are already as low as in the PM group at 24 hours; 3. No change in cortisol conc. occurs from 3 hours to 2 days postnatally in the FT group.

205 N. SASAKI, T. TSUYUSAKI, H. INOMATA, H. NIIMI* and H. NAKAJIMA* (Intr. by H. Takahashi).
Department of Pediatrics, School of Medicine, Chiba University, Chiba, Japan.
Transient hypothyroidism in children with chronic lymphocytic thyroiditis.

Transient hypothyroidism was observed in 5 children aged 6 to 14 years with chronic lymphocytic thyroiditis. In two cases, all thyroid function tests showed definite hypothyroid status and returned to normal range within a few months. The titer of thyroid autoantibodies did not change in these periods. In another two cases, the blood thyroid hormone levels were found to be lowest at the first examination and became normal within one or two months. In one more case, thyroid function tests were found to be hypothyroid range at 9 years of age during the course of the disease from 3 years of age and she was supplemented with desiccated thyroid only for six months. Thereafter she has remained in euthyroid status. It is suggested that transient hypothyroidism might be a common finding in girls suffering from chronic lymphocytic thyroiditis. The pathogenesis remains obscure.

206 C.A. SKLAR, N.K.C. RAMSAY, AND BMT TEAM, University of Minnesota Hospitals, Minneapolis, Minnesota
The Late Effects of Bone Marrow Transplantation (BMT) on Thyroid Function

Thyroid function studies were followed prospectively in 25 patients, all long-term (>1 year) survivors of BMT. There were 13 males and 12 females, ages 0.9-22.5 years (mean 11.7). 21 of 25 patients received 750 R either total body (10) or total lymphoid (11) irradiation as a single dose plus cyclophosphamide as prep for BMT. 10/21 irradiated patients had received additional chemotherapy prior to BMT. 4 patients received only chemotherapy and no irradiation as prep for BMT. Thyroid function was normal pre-BMT in 11/11. Duration of follow-up ranged from 0.75-4.5 years (mean 2.0 years). 8 of 21 (38%) irradiated patients developed biochemical evidence of thyroid failure, 6-20 (mean 13.2) mos after BMT; 7 had elevated TSH (>6µU/ml) with normal T_4 index (5-10.5) and 1 had elevated TSH (30µU/ml) combined with a low T_4 index (3.8). Among the 7 patients with only an elevated TSH, 4 have had subsequent TSH values in the normal range during an 8-33 mos period, whereas 3 have had persistently elevated values. Thyroid function abnormalities did not correlate with age when irradiated, type of radiation or previous chemotherapy. Thyroid studies have remained normal in the 4 patients treated with chemotherapy alone. These results indicate the need for careful monitoring of thyroid function after single dose radiation for BMT. Since some abnormalities appear to be transient, replacement therapy may not be indicated in these individuals.

207 Vetter, U., Winkler, G., Heinze, E., Teller, W.
Dept. of Pediatrics, University of Ulm, FRG
Detection of nocturnal hypoglycemia in children with Typ I diabetes mellitus.

Nocturnal hypoglycemias occur in most diabetic children but only a small part of the children show severe symptomes as seizures and unconsciousness. Hypoglycemia is a potent stimulus for the hypothalamo-pituitary-adrenal axis resulting in a rise of plasma cortisol. MOORE was the first to report that a raised early morning urinary cortisol/creatinine ratio of 55×10^{-6} may therefore indicate nocturnal hypoglycemia in adult diabetics.
In 23 diabetic children the cortisol/creatinine ratio was determined in 1.) early morning urine samples and 2.) overnight urine samples without early morning urine voidings.
The cortisol/creatinine ratio in early morning urine did not differ in children with and without nocturnal hypoglycemia ($33 + 10\times10^{-6}$ vs $35 + 12\times10^{-6}$). Whereas the cortisol/creatinine ratio in overnight urine samples was significantly higher in children with nocturnal hypoglycemia compared to euglycemic children ($5 + 2\times10^{-6}$ vs $31 + 10\times10^{-6}$ $p< 0.01$).
Our results suggest that the cortisol/creatinine ratio in early morning urine is mainly influenced by the diurnal variation of cortisol secretion whereas in overnight urine sampling the cortisol/creatinine ratio can serve as an indicator for nocturnal hypoglycemia.