



Hemodialysis treatment practice of the 1st Department of Paediatrics (Sемmelweis University, Budapest, Hungary) in comparison with international statistics (IPHN)

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Introduction and methods

As a member of the International Pediatric Hemodialysis Network (IPHN) from its initiation in 2013, our Department at the Semmelweis University (Budapest) registers pediatric patients undergoing chronic hemodialysis (HD). Listing patients involves registering patient history, such as the underlying renal disease, known genetic disorders and any prior renal replacement therapy or transplantation and the circumstances. After the enrollment of the patients the details of dialysis management, therapy and clinical parameters are updated every half year. The IPHN register provides statistics for the participants calculated from the data of 75 member dialysis-centers from around 34 countries. Comparing our own statistics and the international trends helps to provide state-of-the-art care for our patients and makes it possible to improve global treatment protocols for pediatric hemodialysis.

	Ist Dept. of Pediatrics	IPHN register
Number of registered HD patients	18 (14+4)	420
eGFR at initiation of HD (mean ± SD) [ml/min/1.73 m ²]	9,1 ± 4,8	8,7 ± 5,8
Age at initiation of HD (mean ± SD) [year]	14,71 ± 3,98	no data
Total time spent on HD (mean ± SD) [year]	1,66 ± 1,79	no data
Number of HD sessions/week (mean ± SD)	2,9 ± 0,2	3,0 ± 0,7
Weekly HD duration (mean ± SD) [hours]	10,6 ± 2,1	11,5 ± 3,0
Anuric patients (<100ml/m ² /day)	57,1%	45,2%

Table 1. HD patients and treatment practice
Ist Dept. of Paed. PD: our own peritoneal dialysis data, IPPN: International Pediatric Peritoneal Dialysis Network data

Patient population

During the time between 2013-2016 we followed up 18 of our patients (current age: 16,37 ± 4,95 years, age at the start of hemodialysis treatment: 14,71 ± 3,98 years). Patients of the Semmelweis University 1st Department of Pediatrics have spent 1,66 ± 1,79 years on hemodialysis on average, due to the fast and efficient placement of our patients on the transplant list, Hungary's joining of the Eurotransplant programme and the increasing number of living donor transplantation occurring among our patients. The most common reasons of end-stage renal disease were glomerulopathies (39%) and hereditary and congenital diseases (33%). The high percentage of hereditary underlying renal diseases and observed syndromes explains the higher rate of comorbid conditions (impaired cognitive development 28,6% own data vs. 12,6% IPHN; ocular abnormalities 14,3% own data vs. 10,0% IPHN; hearing abnormalities 14,3% own data vs. 4,0% IPHN) at our practice than the average occurrence experienced internationally.

	Ist Dept. of Pediatrics	IPHN register
Dialysate buffer concentration (mean ± SD) [mmol/l]	31,9 ± 0,2	33,3 ± 5,7
Dialysate Ca concentration (mean ± SD) [mmol/l]	1,4 ± 0,1	1,4 ± 0,2
Dialysate Na concentration (mean ± SD) [mmol/l]	138,6 ± 3,5	138,6 ± 2,5
Blood flow rate (mean ± SD) [ml/min/m ² BSA]	178 ± 97	167 ± 52

Table 2. Dialysate concentrations and blood flow

(mean ± SD)	Ist Dept. of Pediatrics	IPHN register
Hemoglobin [g/dl]	9,7 ± 1	10,6 ± 1,7
PTH [pg/ml]	352 ± 221	381 ± 521
% patiens: K/DOQI PTH target range (200-300 pg/ml) below / within / above	21,4 / 28,6 / 50	46,5 / 15,9 / 37,6
Serum Ca [mM/L]	2,4 ± 0,2	1,8 ± 0,5
Serum P [mM/L]	2,2 ± 0,7	1,8 ± 0,5
% patients: serum Pi range for age below / within / above	0 / 35,7 / 64,3	14,2 / 55,4 / 30,4
Malnutrition (BMI < 5. pct)	5,5 %	11,2 %

Table 3. Laboratory parameters

% of patients	Ist Dept. of Pediatrics	IPHN register
Oral calcium	21,4%	19,3%
Phosphate binders	71,4%	70,2%
Ca-based P-binders only	42,9%	40,2%
Ca-free P-binders only	21,4%	11,9%
Ca-based and Ca-free P-binders both	7,1%	18,1%
Vitamin D3	42,9%	46,2%
Active vitamin D analogue	78,6%	71,9%
Cinacalcet	0%	5,5%
EPO	100%	79,8%

Table 4. Medication statistics

Results of the comparison

The average of pre-dialysis blood pressure proved to be higher in our center than the average of IPHN register, though we must take into consideration the statistical distortion of the data caused by some of our patients with resistant hypertension. This disfiguration also shows in the number of antihypertensive medications of our patients. Otherwise laboratory parameters and medication statistics fit the international data. The number of complication episodes / 100 hemodialysis sessions in our center was in line with international statistics. Regarding the most common type of complications – hypotensive episodes – our results showed lower rates, meaning a less stressful treatment and better quality of life for our patients. Malnutrition (BMI <5th pct.) – an important sign for concern with regard for morbidity and mortality- was present only in the case of one of our patient.

	Ist Dept. of Pediatrics	IPHN register
Pre-dialysis blood pressure SYS/DIA (mean ± SD) [Hgmm]	140 ± 22 / 85 ± 15	121 ± 19 / 70 ± 21
Nr. of antihypertensive drugs/patient (mean ± SD)	3,3 ± 1,3	1,4 ± 1,4
Nr. of complication episodes/ 100 HD sessions	3,24 (n=57)	3,22 (n=1451)
hypotension	1,76 (n=31)	1,93 (n=1451)
seizures	0 (n=0)	0,10 (n=45)
vomiting	0,17 (n=3)	0,51 (n=231)
muscle cramps	1,25 (n=22)	0,65 (n=295)
bleeding	0,06 (n=1)	0,02 (n=9)

Table 5. Complications of HD treatment and tensions