SURVIVAL ANALYSIS OF PEDIATRIC PATIENTS STARTING RENAL REPLACEMENT THERAPY IN JAPAN:A REPORT OF THE JAPANESE SOCIETY FOR PEDIATRIC NEPHROLOGY SURVEY

Mayumi Sako[1], Daishi Hirano [2], Akira Ashida [3], Eisuke Inoue [1], Tetsuji Kaneko [4], Masataka Honda[4], Shori Takahashi[5] and Motoshi Hattori[6]

[1]National Center for Child Health & Development, Tokyo, Japan ;[2]The Jikei University School of Medicine, Tokyo, Japan;[3]Osaka Medical College, Osaka, Japan ;[4]Tokyo Metropolitan Children's Medical Center , Tokyo, Japan ; [5]Nihon University School of Medicine, Tokyo, Japan;[6]Tokyo Women's Medical University, Tokyo, Japan

OBJECTIVES

The Japanese Society for Pediatric Nephrology (JSPN) performed a cross-sectional, nationwide survey of Japanese patients aged less than 20 years who were newly diagnosed for end-stage renal disease (ESRD) from 2006 to 2013. We aimed to determine survival, mortality hazards and causes of death in Japanese pediatric patients starting renal replacement therapy (RRT) between 2006 and 2013.

RESULTS

A total of 701 patients less than 20 years started RRT from 2006 to 2013 in Japan and, about 90% of clinical departments which meet the paediatric patients newly diagnosed for ESRD reported their data.

During 2492.4 patients-years of follow-up, 39 patients (5.7 %) died, 24 patients of whom commenced RRT with under 5 years old.

The crude mortality rate was 15.6 deaths per 1,000 patient-years in the age group 0-19 years, and the Japanese mortality rate was similar to that reported in the European [2] and Canadian [3] registries (20.0 and 17.9 deaths per 1,000 patient-years, respectively, age 0-19 years).

Overall survival at 5 years was 92.4 % (95%confidence interval[CI], 90.0 to 94.9) with the poorest survival was observed in patients aged 0–4 years. There was no significant difference in survival between patients treated initially with HD or PD. Infection (n=14, 36 .0%) and cardiovascular disease (n=5, 12.8%) were the main causes of death in Japanese paediatiric RRT patients.

Table 1. Comparison of characteristics between paediatric RRT patients

Characteristic	HD (N=121)	PD (N=423)	pre-emptive Tx (N=157)	Overall (N=701)
	N(%)	N(%)	N(%)	N(%)
Gender (male)	72(57.2)	242(59.5)	102(65.0)	416(59.3)
Age at start of RRT, in years				
0–4	23(19.0)	183(43.3)	8(5.1)	214(30.5)
5–9	16(13.2)	73(17.3)	40(25.5)	129(18.4)
10–14	33(17.3)	111(26.2)	64(40.7)	208(29.7)
15–19	49(40.5)	56(13.2)	45(28.7)	150(21.4)
Primary renal disease				
CAKUT	23(19.0)	150(35.5)	89(56.7)	262(37.4)
Glomerulonephritis	35(29.0)	79(18.7)	13(8.3)	127(18.1)
Hereditary nephropathy	22(18.2)	79(18.7)	11(7.0)	112(16.0)
Cystic kidney disease	12(9.9)	47(11.1)	21(13.4)	80(11.4)
Miscellaneous	21(17.3)	52(12.2)	35(11.4)	91(13.0)
Missing	5(4.1)	8(1.9)	3(1.9)	13(1.8)
Unknown	3(2.5)	8(1.9)	2(1.3)	16(2.3)

METHODS

Individual patient data on date of birth, gender, primary renal disease, start date of RRT, treatment modality, change in treatment, date of death and causes of death were extracted form a cross-sectional, nationwide survey from 2006 to 2013.

This survey started in 2012 [1] and collected information every 3 years form about 770 clinical departments in Japan, including all institutions that are members of JSPN, Japanese Society for Dialysis Therapy (JSTD) and Japanese Society for Clinical Renal Transplantation (JSCRT), and all university and children's hospitals.

The definition of ESRD
Irreversible kidney function disorder when treatment with RRT (dialysis or pre-emptive transplant [Tx]) becomes necessary to sustain life.

The survival probability was calculated by the Kaplan-Meier method. The mortality rates (deaths per 1000 person-years of observation) were also calculated. Differences between groups were analyzed using Cox regression hazard ratios (HR).

Table 2. Probabilities and hazard ratios of death at 5 years and of receiving a Tx within 5 years, by age group

Age group	5-year survival		Received transplant within 5 years	
(years)	%(95%CI)	HR(95%CI)	%(95%CI)	HR(95%CI)
0-4	84.3（78.6-90.5）	5.7(1.7-18.8）	42.4(33.0-54.4)	1.7(1.1-2.6)
5-9	97.2（94.2-100）	1.1(0.2-5.3）	55.9(45.3-69.0)	1.5(0.9-2.3)
10-14	94.8（90.8-99.1）	1.6(0.4-6.3）	51.4(42.7-61.8)	1.7(1.1-2.5)
15-19	96.9(93.5-100）	1	73.2(65.1-82.3)	1

Table 3. Probabilities of death at 5 years and of receiving a Tx within 5 years, by modality at start

Modality	5-year survival	Received transplant within 5 years	
	%(95%CI)	%(95%CI)	HR(95%CI)
PD	91.2(87.9-94.5)	40.9(34.7-48.2)	0.92(0.6-1.3)
HD	88.1(80.7-96.3）	51.8(39.3-68.2)	1
pre-emptive Tx	99.0(97.2-100）	100(by definition)	-

Table 4. Causes of death, by treatment modality at death

Causes of death	HD (N=8)	PD (N=29)	Tx (N=2)	Overall (N=39)
	N(%)	N(%)	N(%)	N(%)
Infections	1(12.5)	12(41.4)	1(50.0)	14(35.9)
Cardiovascular	1(12.5)	4(13.8)	0	5(12.8)
Cerebrovascular	0	0	0	0
Malignancy	0	0	0	0
Other	4(50.0)	5(17.2)	0	9(23.1)
Unknown	2(25.0)	8(27.6)	1(50.0)	9(23.1)

CONCLUSIONS

The mortality rate in Japanese paediatric ESRD patients was similar to that reported in the European and Canadian registries. Age at start of RRT is an important factor in survival since the poorest survival was observed in the youngest group. Further studies are required to improve care in these youngest patients .

Address for Correspondence: Mayumi Sako MD, PhD
National Center for Child Health & Development, Tokyo, Japan
e-mail: sako-m@ncchd.go.jp

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