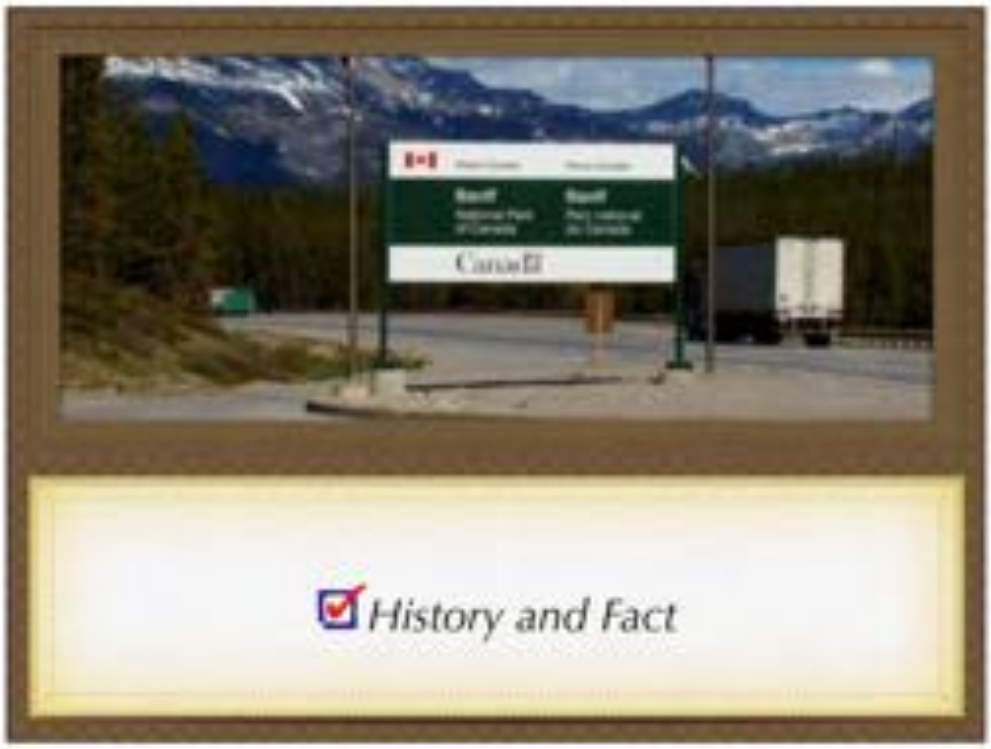
Preemptive腎移植 推進へのアプローチ

市立札幌病院　腎臓移植外科
原田　浩

Agenda

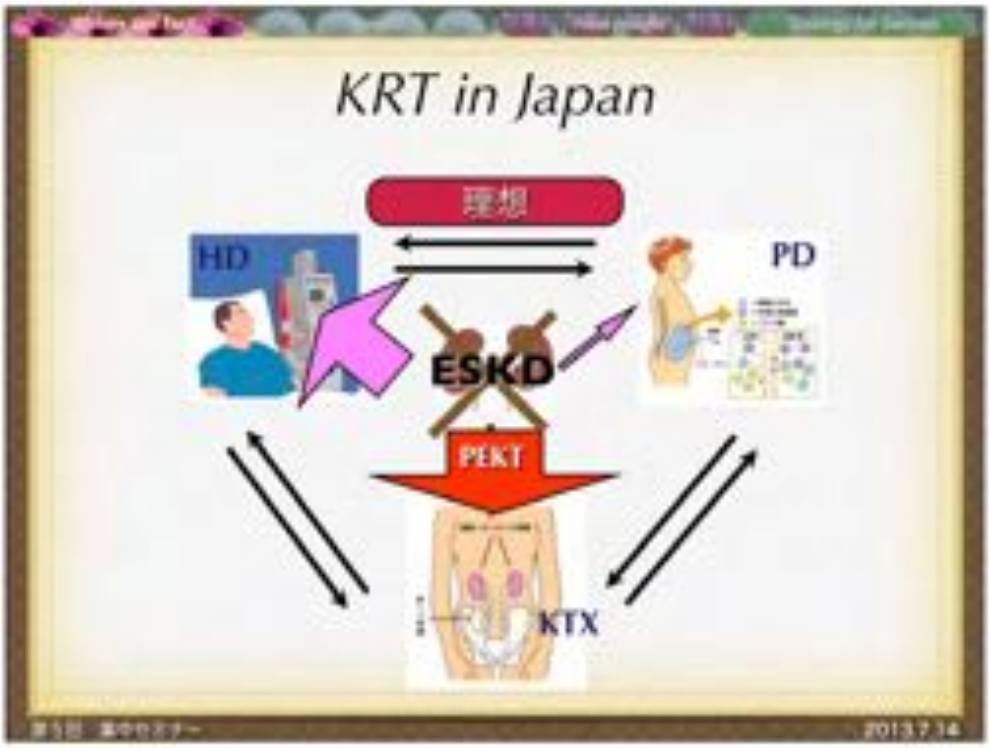
PEKT: preemptive kidney transplant

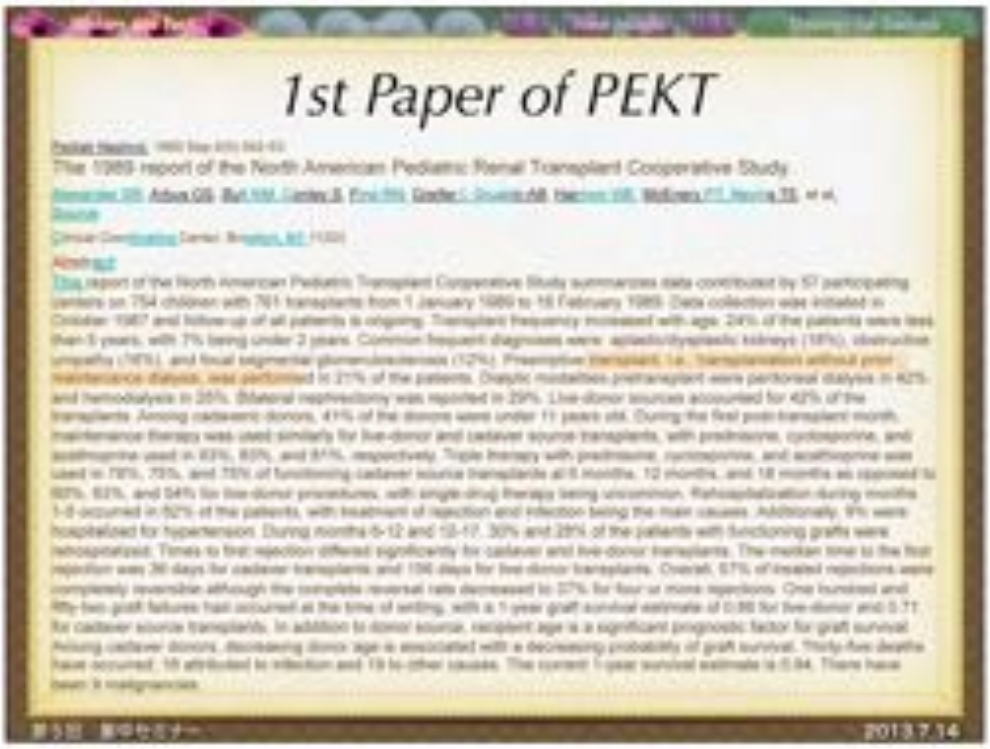
- ☑ History and Fact
- ☑ Benefit
- ☑ New Insight
- ☑ Strategy for Success

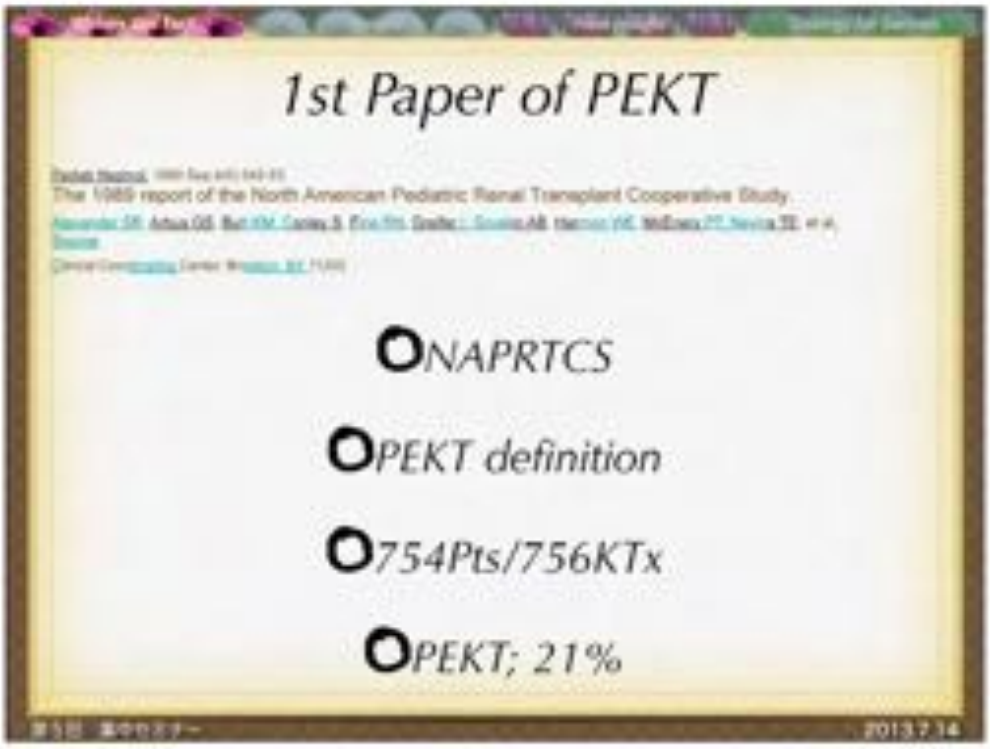

Canada
History and Fact

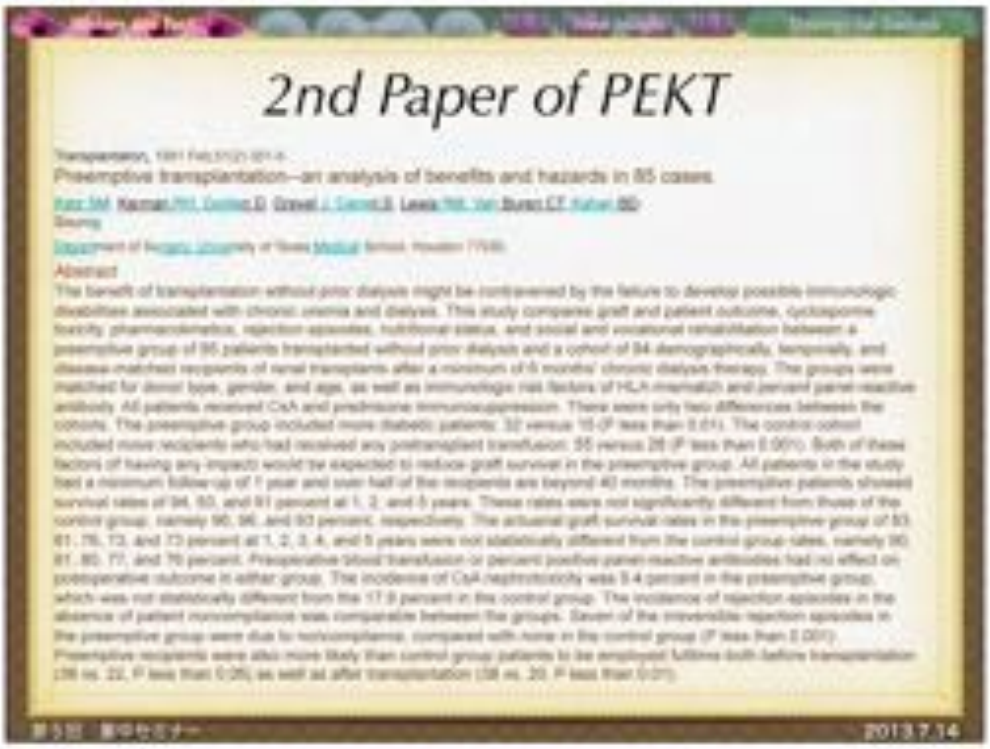

Definition
preemptive
Pre-emptive (preemptive)
renal, kidney transplantation
PET, PRT, PKT, PEKT
先行的腎移植、維持透析を経ないでの移植

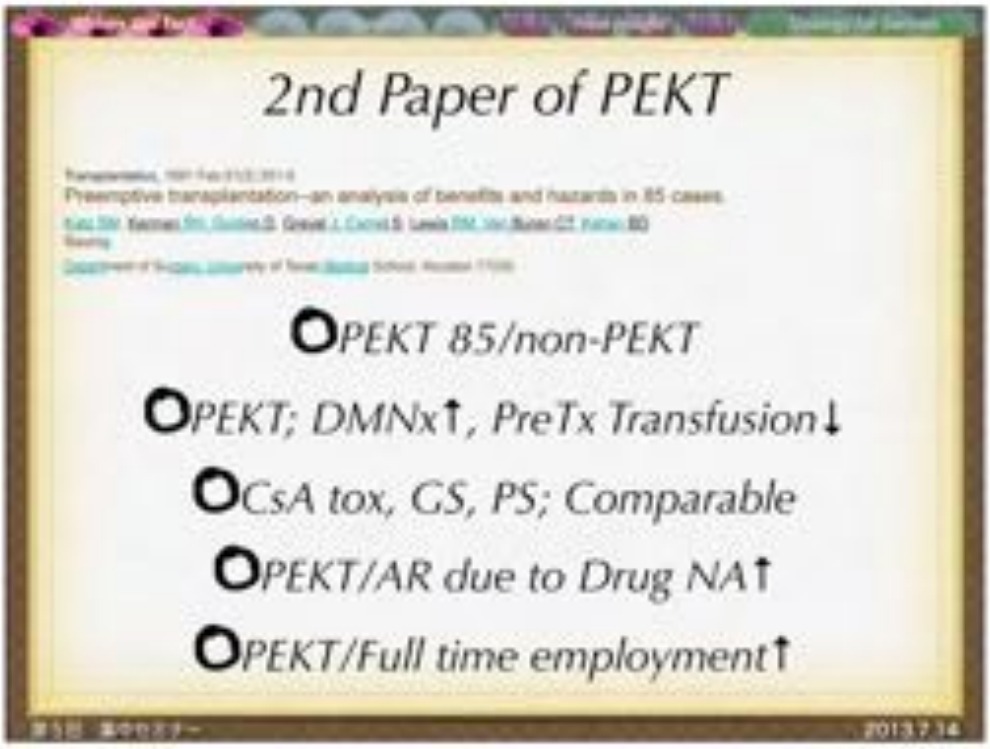
腎代償療法の一つに過ぎません




1st Paper of PEKT
The 1989 report of the North American Pediatric Renal Transplant Cooperative Study
Abstract
2013.7.14

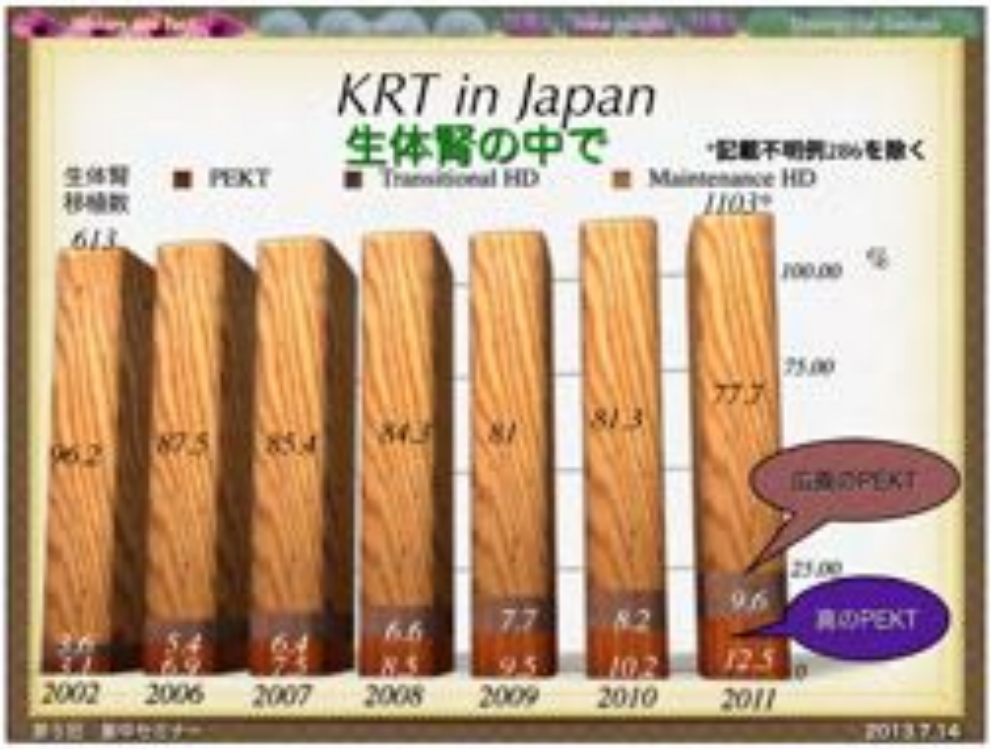

1st Paper of PEKT
The 1989 report of the North American Pediatric Renal Transplant Cooperative Study
NAPRTCS
PEKT definition
754Pts/756KTx
PEKT; 21%
2013.7.14

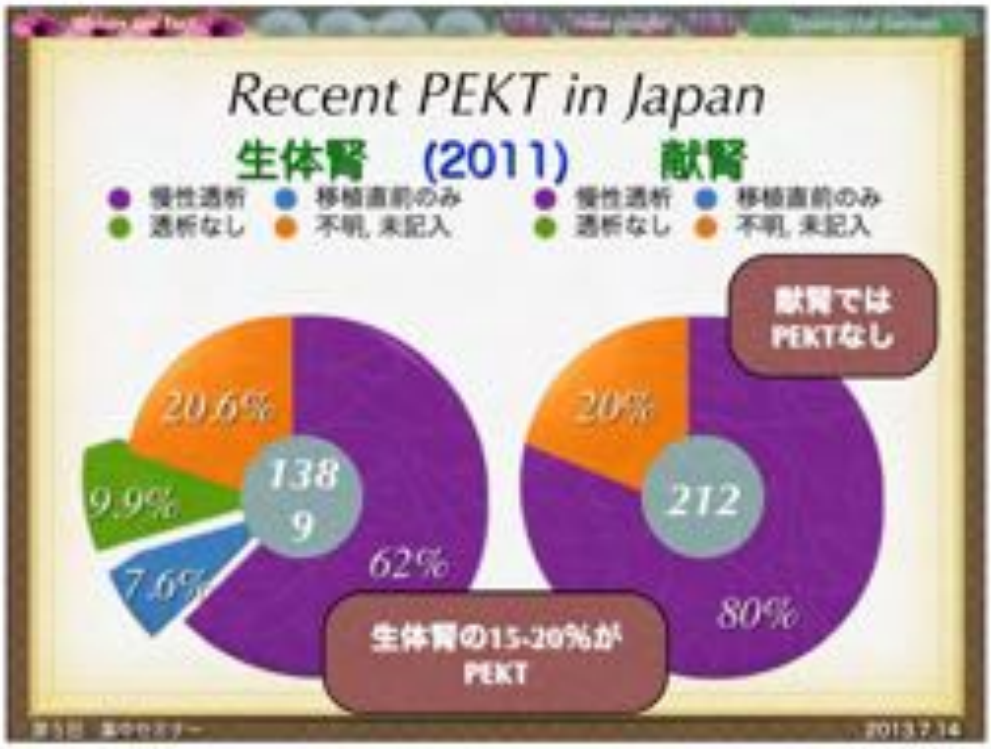

2nd Paper of PEKT
Preemptive transplantation--an analysis of benefits and hazards in 85 cases.
Abstract
2013.7.14


2nd Paper of PEKT
Preemptive transplantation--an analysis of benefits and hazards in 85 cases.
PEKT 85/non-PEKT
PEKT; DMNx↑, PreTx Transfusion↓
CsA tox, GS, PS; Comparable
PEKT/AR due to Drug NA↑
PEKT/Full time employment↑
2013.7.14


1st Paper of PEKT in Hokkaido
1998年日本腎臓学会総会
血液浄化法を経ずして腎移植を施行した
症例9例の臨床的検討
2013.7.14


KRT in Japan
2011
Living Donor KTs 1,389
Deceased Donor KTs 212
Dialysed Pts 304,816
CKD Pts on WL 12,767*
86.2%が生体腎 (2011)
2013.7.14

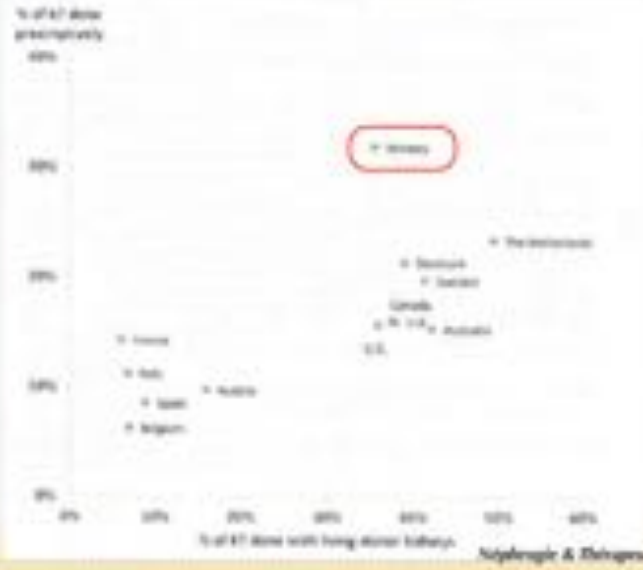

KRT in Japan
生体腎の中で
*記載不明例2%を除く
生体腎移植数
PEKT
Transitional HD
Maintenance HD
613
1103*
%
100.00
75.00
25.00
0
96.2
87.5
85.4
84.5
81
81.3
77.7
9.6
8.2
7.7
6.6
5.4
3.9
12.5
10.2
9.5
8.5
7.4
2002
2006
2007
2008
2009
2010
2011
以後のPEKT
前のPEKT
2013.7.14


Recent PEKT in Japan
生体腎　(2011)　献腎
慢性透析
移植直前のみ
透析なし
不明, 未記入
慢性透析
移植直前のみ
透析なし
不明, 未記入
献腎では
PEKTなし
20.6%
9.9%
7.6%
62%
138
9
20%
212
80%
生体腎の15-20%が
PEKT
2013.7.14


PEKT in SCGH
生体腎総数の推移
%
Non PEKT LD
PEKT
40
30
20
10
0
生体腎の
35%
がPEKT
2013.7.14


PEKTには地域差が
20%
移植外科医
の
熱意型
10%
???
30%
移植内科医
の
熱意型
2013.7.14

PEKTには国により差がある

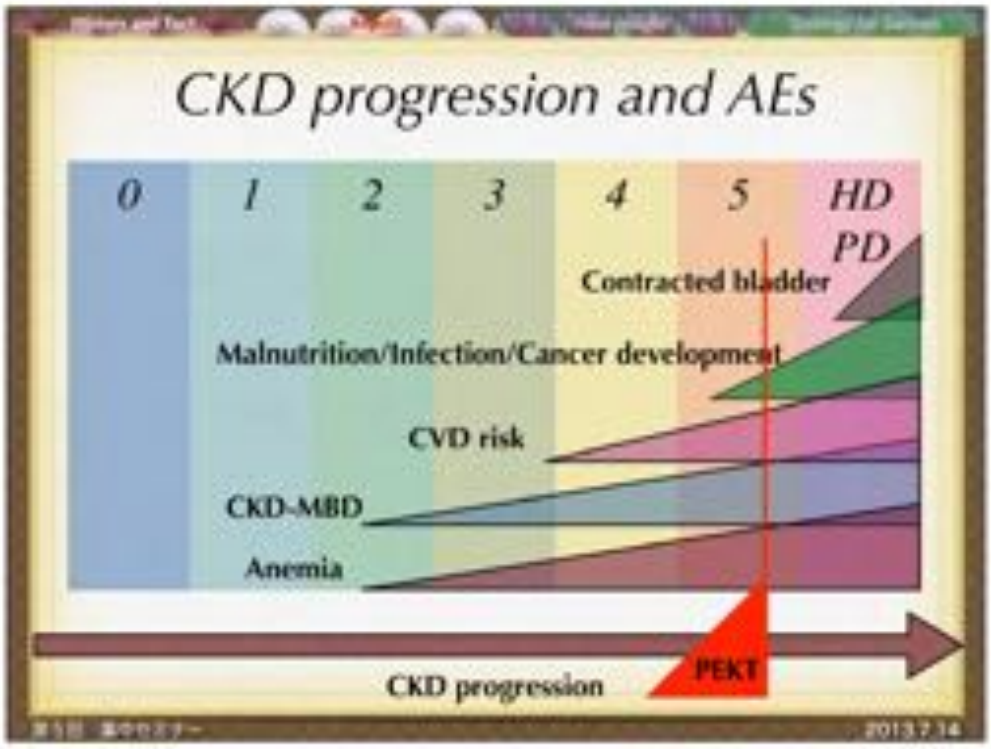


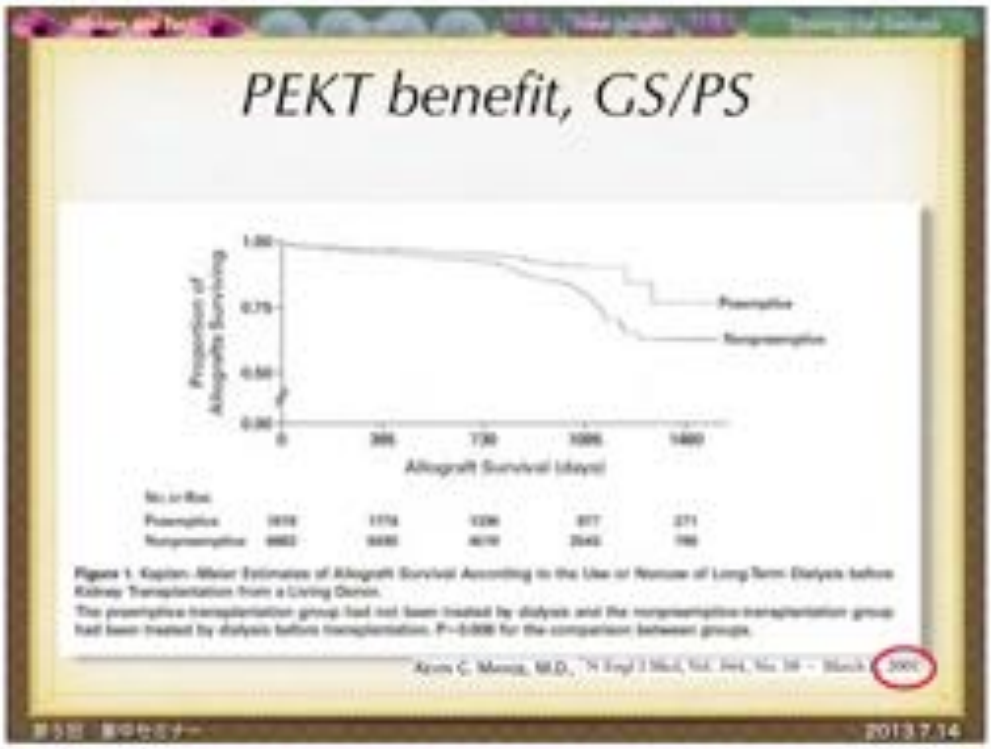
Nephrologie & Therapeutique 2012 438

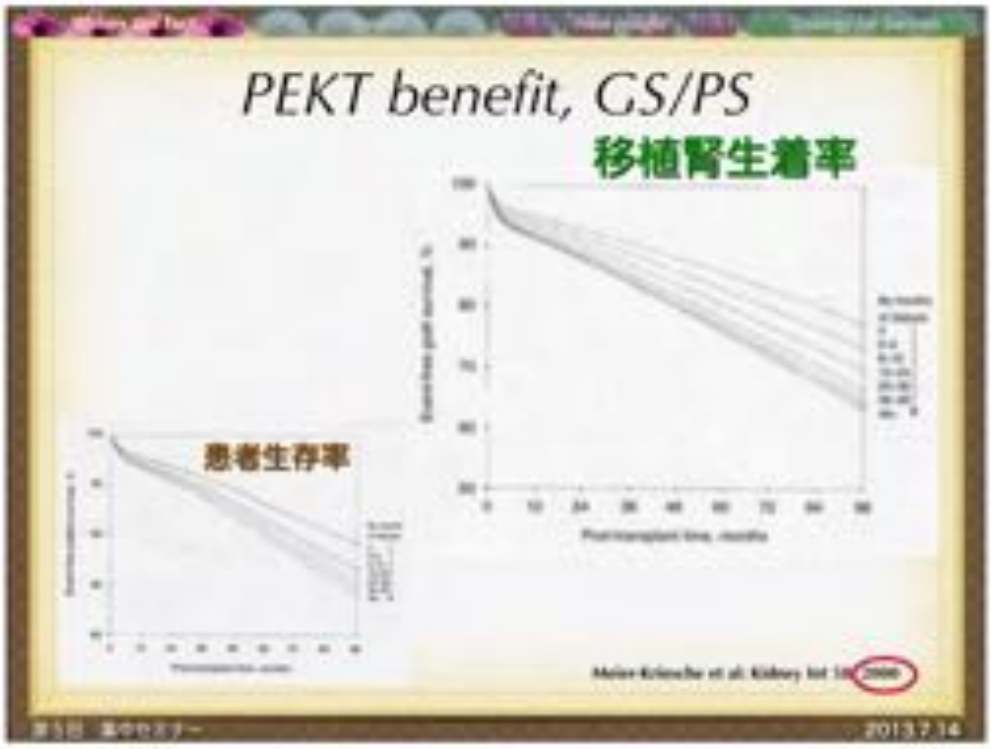
Summary; Benefit

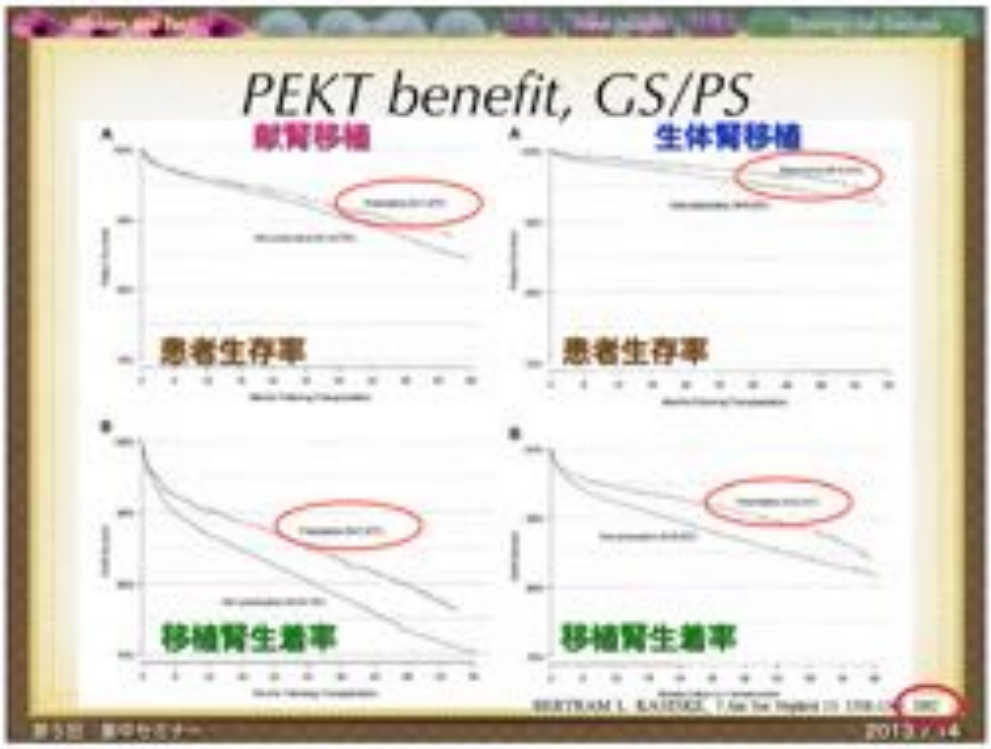
- ✓ もともと行われていたKRT
- ✓ 1990年ころからの概念
- ✓ 日本においては15-20%がPEKT
- ✓ 日本では献腎でのPEKTはほぼない
- ✓ 地域差がある

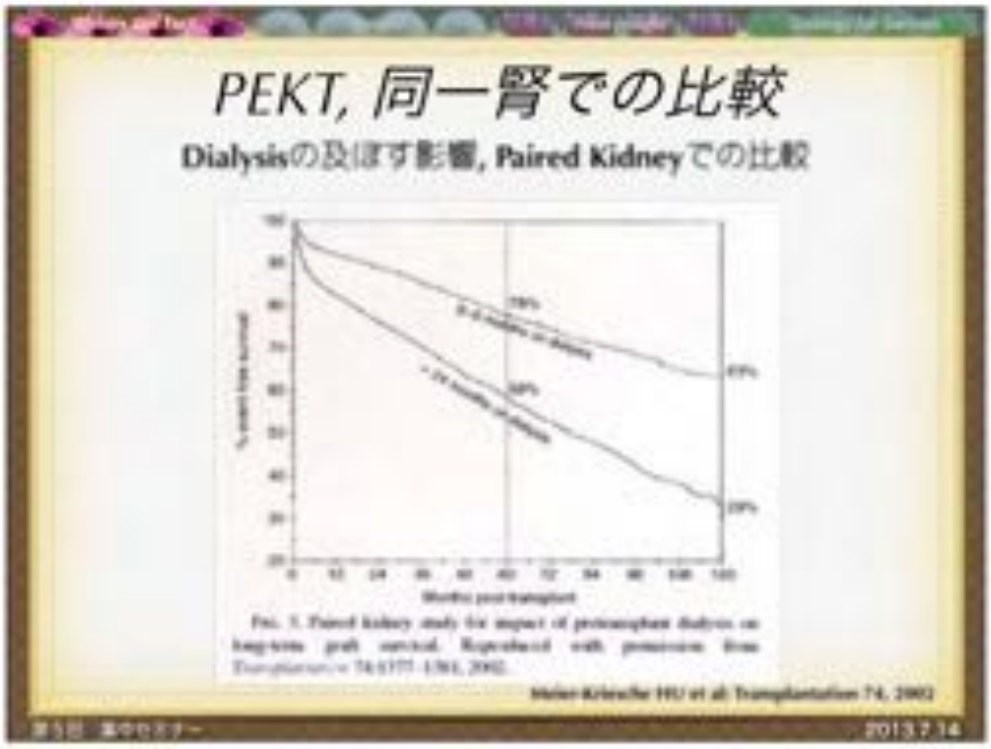

Benefit


CKD progression and AEs
0
1
2
3
4
5
HD
PD
Contracted bladder
Malnutrition/Infection/Cancer development
CVD risk
CKD-MBD
Anemia
PEKT
CKD progression

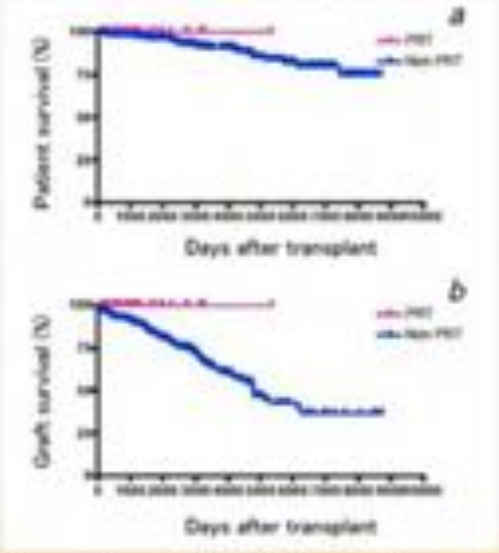

PEKT benefit, GS/PS
Preemptive
Nonpreemptive
Allograft Survival (days)
2013.7.14


PEKT benefit, GS/PS
移植腎生着率
患者生存率
2013.7.14


PEKT benefit, GS/PS
献腎移植
生体腎移植
患者生存率
患者生存率
移植腎生着率
移植腎生着率
2013 / 7 / 14


PEKT, 同一腎での比較
Dialysisの及ぼす影響, Paired Kidneyでの比較
Months post-transplant
Meier-Kriesche HU et al. Transplantation 74, 2002
2013.7.14

PEKT benefit, GS/PS



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PEKTではなぜGS/PSが良いか？

2013.7.14

Lead-time bias?

2013.7.14

PEKTではARが少ない

Table 2. Rates of biopsy-confirmed acute rejection in the first year post-transplant

	Pre-emptive (*n* = 1819)	Non-pre-emptive (*n* = 6662)	*P*-value
By 7 days	0.22%	0.69%	0.019
By first month	3.16%	8.13%	0.001
By third month	6.05%	14.5%	0.001
By sixth month	7.09%	17.3%	0.001
By twelfth month	8.63%	20.0%	0.001

PKTでは拒絶反応が
1/3-1/2

Mange KC et al. Nephrol Dial Transplant 16, 2001

2013.7.14

PEKTではARが少ない

TABLE 1. OUTCOMES IN THE STUDY GROUPS.*

OUTCOME	PREEMPTIVE TRANSPLANTATION (N=1818)	NONPREEMPTIVE TRANSPLANTATION (N=6662)
	percent	
Delayed allograft function†	2.5	5.1
Biopsy-confirmed acute rejection within 6 mo	3.5	14.6
Allograft failure	2.8	5.8
Death	0.2	0.3
Repeated transplantation	<0.1	0.1
Long-term dialysis	3.5	5.4

*The preemptive-transplantation group had not been treated by dialysis and the nonpreemptive-transplantation group had been treated by dialysis before transplantation.

†Delayed allograft function was defined by the use of dialysis within the first week after transplantation.

N Engl J Med, Vol. 344, No. 10 · March 8, 2001

PEKTでは
ARは1/3

PEKT ではT cell機能が低下

Initiation of Hemodialysis Treatment Leads to Improvement of T-Cell Activation in Patients With End-Stage Renal Disease

Harald Kaul, MD, Matthias Girndt, MD, Urban Sester, MD, Martina Sester, PhD, and Hans Köhler, MD

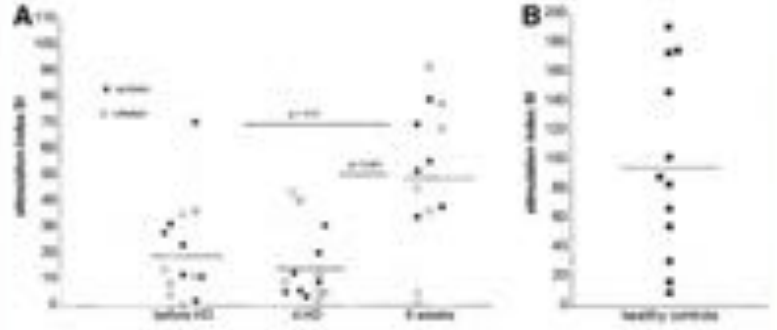

Fig 1. T-cell proliferation during initiation of hemodialysis treatment. (A) PBLs of patients were drawn before the first hemodialysis treatment (before HD), before the fourth hemodialysis treatment (4 HD), and after 8 weeks on intermittent hemodialysis before HD. We determined T-cell proliferation after stimulation with PHA, 250 ng/mL. Stimulation index is defined as counts with stimulation in relation to counts without stimulation. $P < 0.05$ is considered significant. (B) The control group consisted of 12 healthy people. T-cell proliferation of controls (SI, 94.8 ± 60.80) was significantly greater compared with patients (controls versus first HD: $P < 0.001$, controls versus 8 weeks: $P < 0.05$, Mann-Whitney test).

PEKT ではT cell機能が低下

Initiation of Hemodialysis Treatment Leads to Improvement of T-Cell Activation in Patients With End-Stage Renal Disease

Harald Kaul, MD, Matthias Girndt, MD, Urban Sester, MD, Martina Sester, PhD, and Hans Köhler, MD

Costimulation functionが低下？

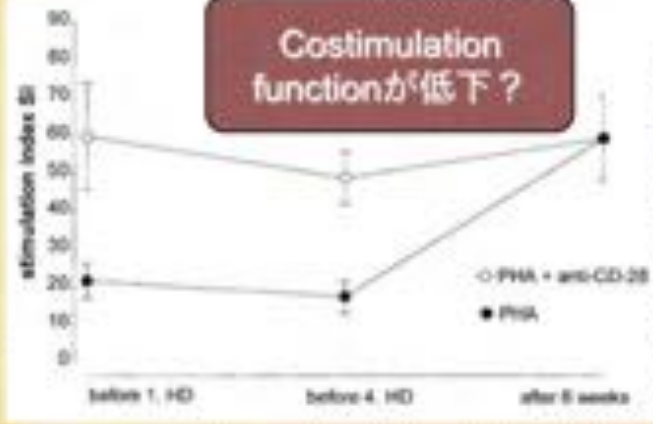

Fig 2. T-cell proliferation during initiation of hemodialysis treatment after supplementation with anti-CD 28 antibodies. PBLs of patients were drawn before the first (1. HD), before the fourth (4. HD), and after 6 weeks on intermittent hemodialysis before each hemodialysis treatment, and T-cell proliferation was determined after stimulation with PHA, 250 ng/mL (●) and PHA, 250 ng/mL, + anti-CD28 AK, 500 ng/mL (○). Stimulation index is defined as counts with stimulation in relation to counts without stimulation. Data expressed as mean ± SEM.

PEKT では動脈硬化が少ない

	AS(+)	AS(-)	Total
PEKT	0	8	8
non-PEKT	30	30	60

iliac artery, p<0.01

Hanada H. et al. Transplant Proc 28, 1996

動脈硬化が少ないと移植腎生着が良い

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手厚いCKD管理のおかげ？
✓ Private Insurance
✓ Early referral
✓ 大規模医療機関
✓ 経験豊富なNephrologist
✓ 都市部での診療
✓ 付随するScreeningの励行
2013.7.14


GS/PS以外のbenefit
2013.7.14

PEKT の方が伸びる

小児腎移植症例の身長の変化

	移植時	移植後3年
Overall		
Pre-emptive	-1.47±1.22	-1.47±1.22
Non pre-emptive	-2.19±2.22	-1.87±2.60
15歳未満		
Pre-emptive	-0.84±0.73*	-0.53±1.65*
Non pre-emptive	-2.86±1.93	-3.22±1.94
15歳～18歳		
Pre-emptive	-2.25±1.34	-2.93±0.83
Non pre-emptive	-1.36±2.38	-0.51±2.51

1990 年日本人男女別標準成長曲線による *P <0.05 vs. Non pre-emptive

Hanada H. et al. Int J Urol 8, 2001

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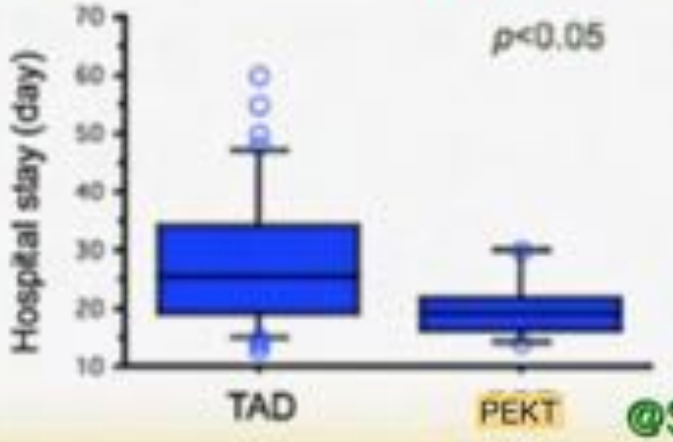
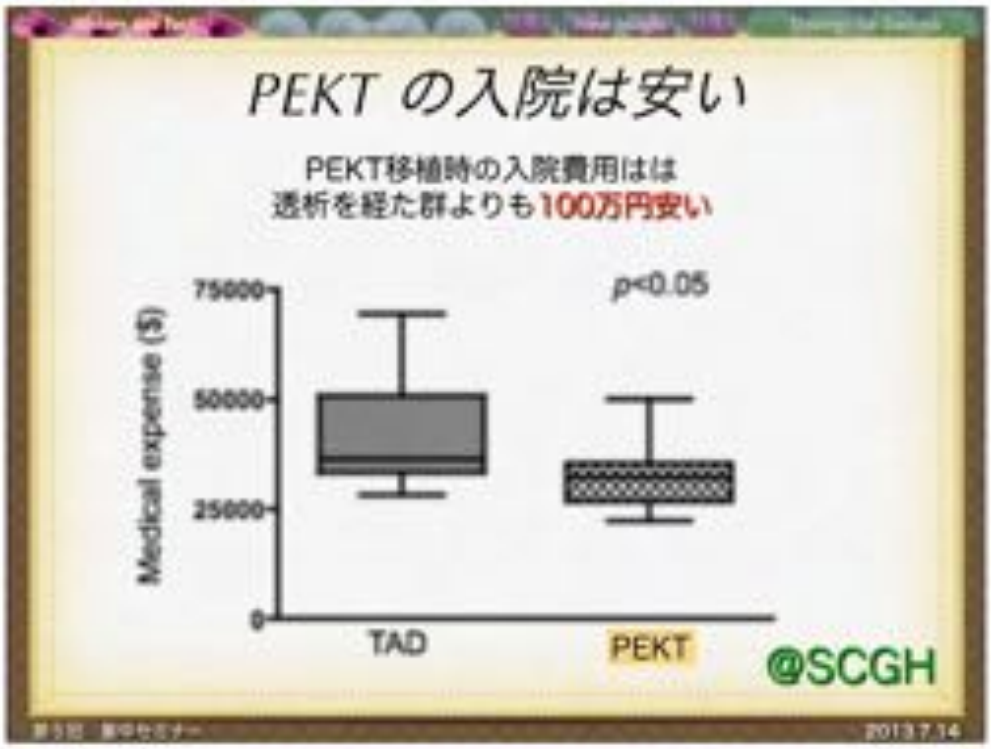
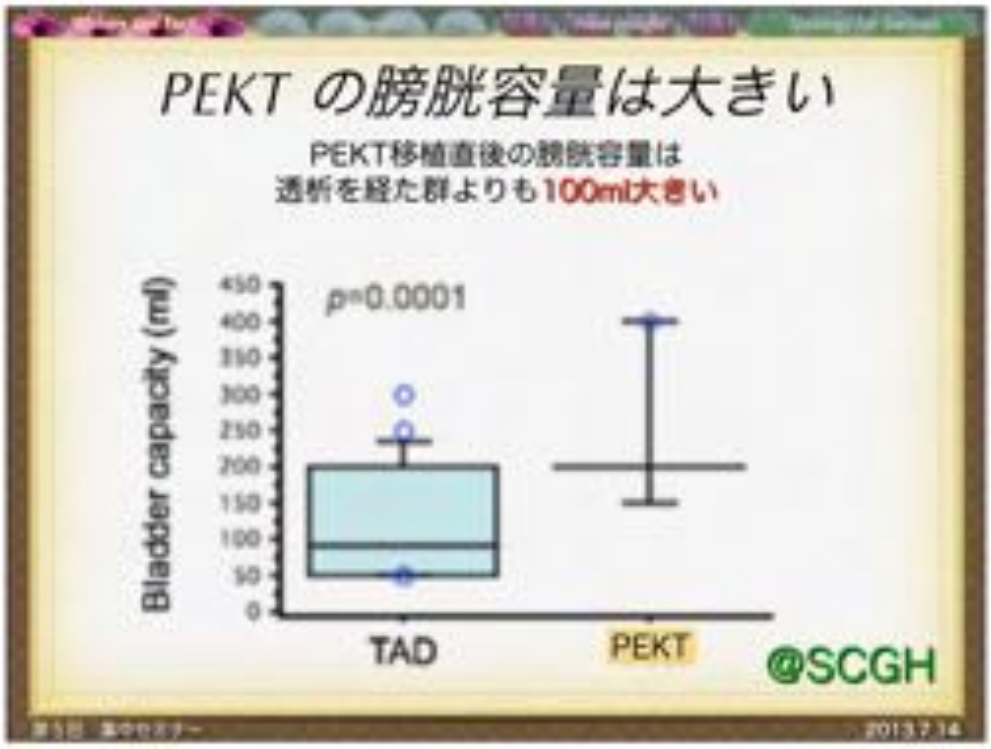
PEKT の入院期間は短い

PEKT移植時の入院期間は
透析を経た群よりも1週間短い



2013.7.14


PEKT の入院は安い
PEKT移植時の入院費用はは
透析を経た群よりも100万円安い
p<0.05
Medical expense ($)
75000
50000
25000
0
TAD
PEKT
@SCGH
2013.7.14


PEKT の膀胱容量は大きい
PEKT移植直後の膀胱容量は
透析を経た群よりも100ml大きい
p=0.0001
Bladder capacity (ml)
450
400
350
300
250
200
150
100
50
0
TAD
PEKT
@SCGH
2013.7.14

萎縮膀胱ではVURが多い

頻尿がないという話のみではないです

	VUR (n=32)		No VUR (n=111)
Imx (triple/quadruple)	25/7	NS	77/35
Age	34.5 ± 1.9	NS	36.1 ± 1.2
Gender (M/F)	16/18	NS	73/38
Live/Cadaveric	23/9	p=.0002	96/5
HD period (>10/≤10y)	31/11	p=.0026	94/7
Bladder Cap (>50/≤50ml)	24/8	p=.0009	97/4
AR (yes/no)	9/23	NS	33/78
Follow-up period (d)	1538.2 ±158.5	NS	1480.9 ± 84.0

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VURは移植腎機能悪化に繋がる

移植後VURのあるなしは移植腎生着率に影響します

間接的メリット

保存期CKDケアの質の向上

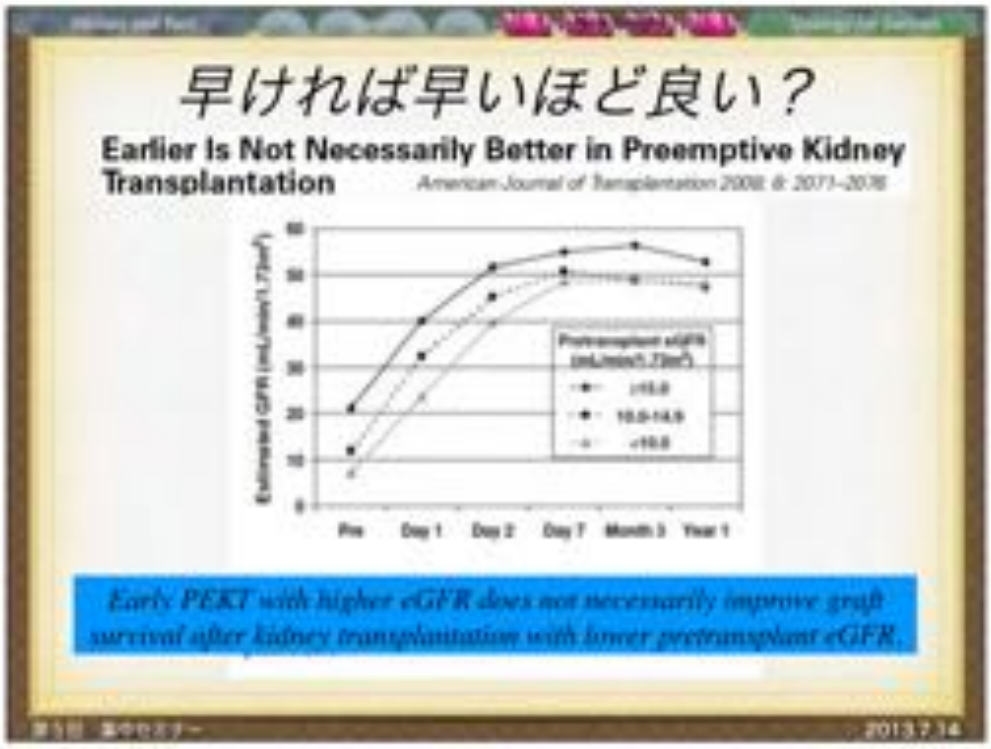
- ✓ より早期における専門医の診療（Early referal）
- ✓ 感染症、癌スクリーニング率の向上
- ✓ ワクチン摂取率向上（HBV, peumococcus）
- ✓ CVDスクリーニング・積極的IHD除外
- ✓ CKD-MBD・Anemiaへの積極的治療

柴垣有吾、今日の移植2012

Summary; Benefit

- ✓ GS/PSが良い
- ✓ QoLが良い
- ✓ 医療経済的にも良い
- ✓ 小児では身長の獲得、精神発達面で利点
- ✓ 透析に関する事象のBy-pass
- ✓ 膀胱機能を維持したままの手術

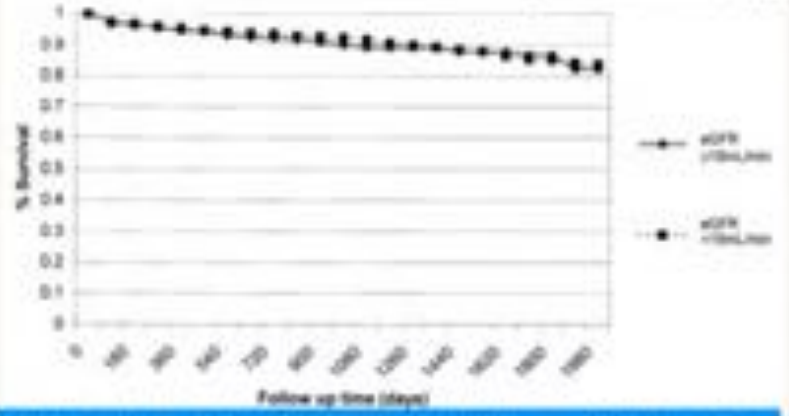

New Insight


早ければ早いほど良い？
Earlier Is Not Necessarily Better in Preemptive Kidney Transplantation
American Journal of Transplantation 2008; 8: 2071–2076
Pre
Day 1
Day 2
Day 7
Month 3
Year 1
Early PEKT with higher eGFR does not necessarily improve graft survival after kidney transplantation with lower pretransplant eGFR.

早ければ早いほど良い？

The Impact of Residual Renal Function on Graft and Patient Survival Rates in Recipients of Preemptive Renal Transplants

Am J Kidney Dis 42:1275-1282 2003



PEKT should be delayed as long as possible, provided the patient does not have uremic symptoms and dialysis can be safely avoided.

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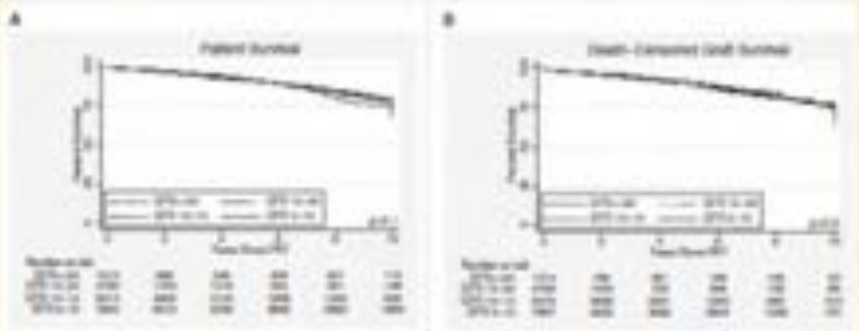
早ければ早いほど良い？



Trends in the Timing of Pre-emptive Kidney Transplantation

2013.7.14

TABLE 1. Early and late complications after preemptive and nonpreemptive kidney transplantation

	Preemptive	Nonpreemptive	P value
n	191	247	
Early complications			
Delayed graft function	7 (4%)	24 (10%)	0.018
Primary nonfunction	3 (2%)	7 (3%)	0.38
Acute rejection	20 (11%)	39 (16%)	0.11
Wound complications	32 (17%)	47 (19%)	0.54
Late complications			
Cardiovascular	14 (7%)	17 (7%)	0.86
Infections	35 (18%)	44 (18%)	0.89
Surgical	24 (13%)	33 (13%)	0.81

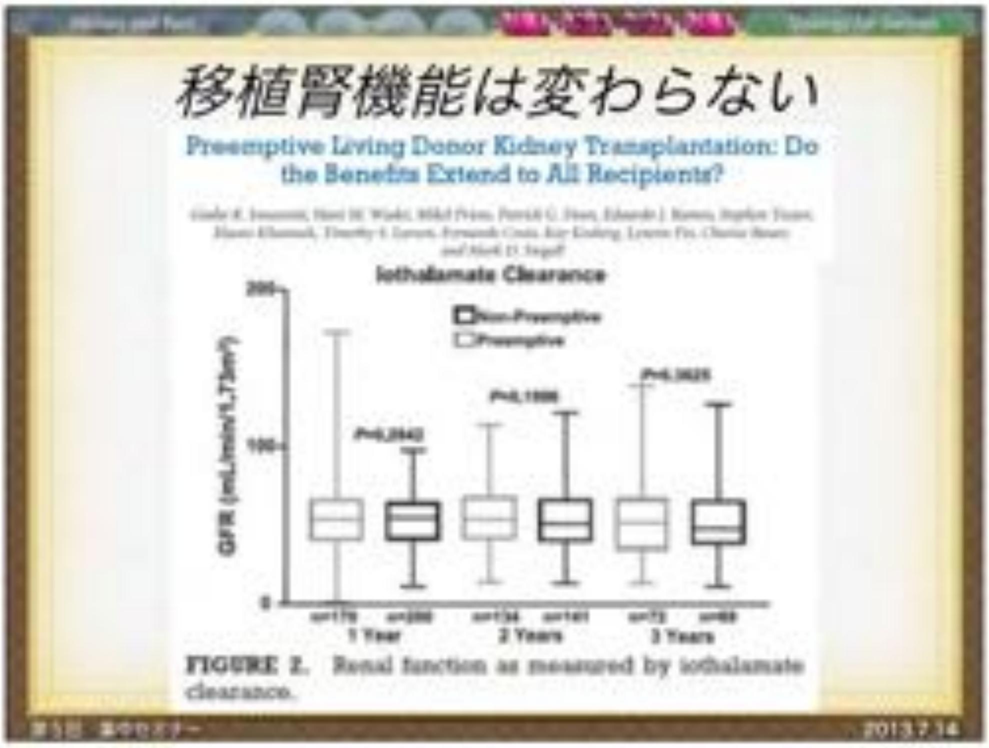
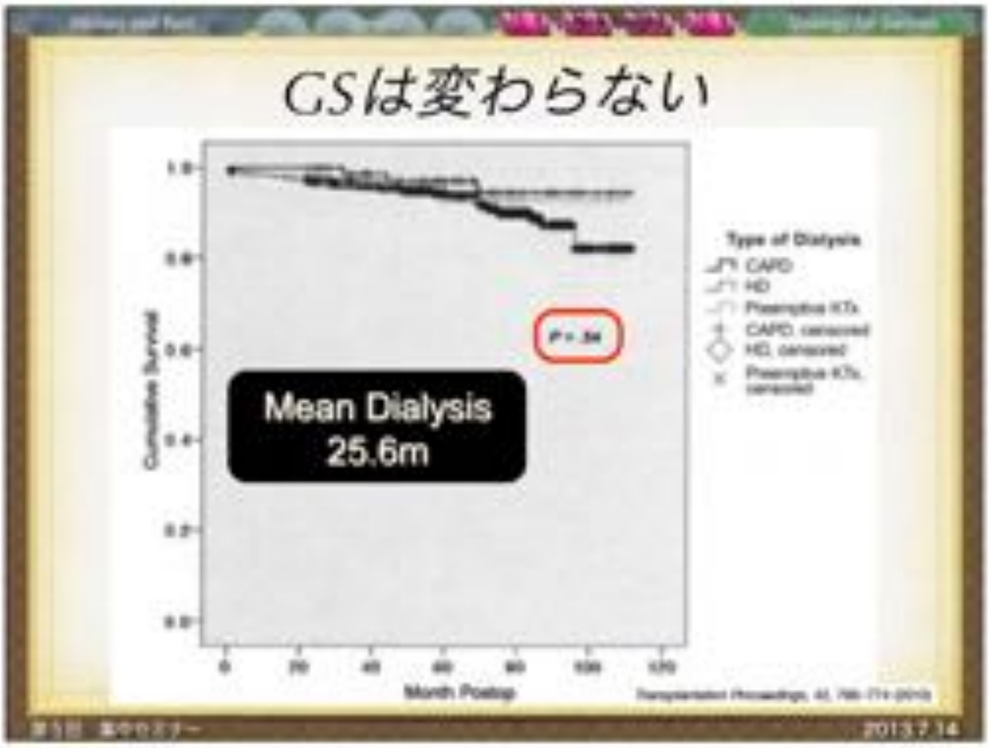
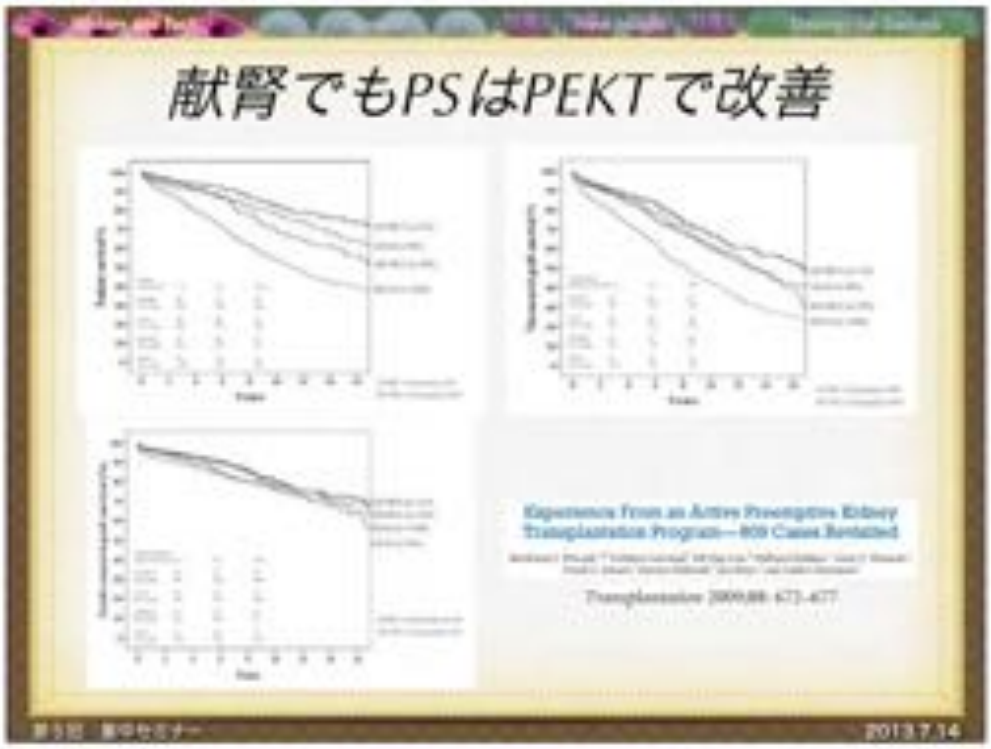


FIGURE 2. Renal function as measured by iothalamate clearance.


Death censored GSの改善
Preemptive Living Donor Kidney Transplantation: Do the Benefits Extend to All Recipients?
Patient Survival
Graft Survival (Censoring for Patient Death)


GSは変わらない
Type of Dialysis
Mean Dialysis
25.6m
Month Postop


献腎でもPSはPEKTで改善
Experience From an Active Preemptive Kidney Transplantation Program—809 Cases Revisited
Transplantation 2009;88:473-477
2013.7.14


PEKT, Deceased Donor
Frequency of Early Deceased Donor Kidney Transplants
Preemptive
Dialysis in days <1 Year
120,000以上のSRTRのDataの解析
9%がPEKT
Clin J Am Soc Nephrol 8: 575–582, 2013.
2013.7.14

PEKT, Deceased Donor

Adjustment Type	Population Analyzed	Death (Hazard Ratio, 95% Confidence Interval)	Death-Censored Graft Loss (Hazard Ratio,95% Confidence Interval)
Multivariable*	Full population†	1.06 (0.99–1.12, P=0.07)	1.23 (1.15–1.32, P<0.001)
SRTR	Full population†	1.09 (1.03–1.16, P=0.005)	1.25 (1.17–1.33, P<0.001)
Propensity	Propensity matched‡	1.06 (0.99–1.14, P=0.06)	1.21 (1.12–1.30, P<0.001)
Multivariable*	10×variable matched§	1.09 (0.97–1.15, P=0.20)	1.26 (1.17–1.36, P<0.001)
Multivariable*	Recipients under 65 yr	1.03 (0.96–1.10, P=0.50)	1.29 (1.16–1.34, P<0.001)
Multivariable*	Recipients aged 65 yr and older	1.19 (1.09–1.35, P=0.007)	1.12 (0.92–1.35, P=0.30)

*Adjusted for all variables listed in Table 2 with the exception of blood type.
†All early or preemptive deceased donor transplant recipients (n=27,420).
‡Propensity score–matched population (n=18,870).
§Matched on sex, race (ethnicity), diabetes status, hepatitis C status, pre-tx transfusion status, core antigen mismatch status, donor age, recipient age, transplant year, and waiting time (n=38,368).

1Y以内のHD後KTxとPEKTのPSでは
65歳以上で無い限り差はない

Clin J Am Soc Nephrol 8: 575–582, 2013

PEKT, 2nd KTx

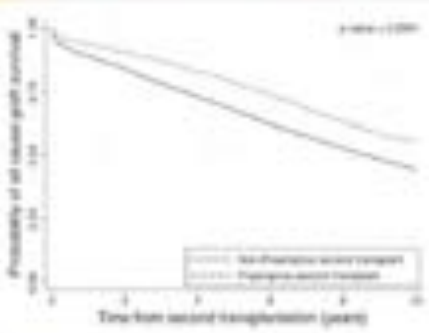


FIGURE 1. Time to all-cause graft loss.

TABLE 4. Risk of DGFC by the duration of dialysis exposure between first and second transplantation

Duration of dialysis between first and second transplantation	Hazard of increasing dialysis duration between first and second transplantation compared with reference group: preemptive second transplantation
Preemptive second transplantation	1.00
1–7 days dialysis after first transplant failure	
Dialysis 7 days to 0.9 yr	1.16 (1.00–1.35)
Dialysis 1–1.9 yr	1.28 (1.10–1.52)
Dialysis 2–2.9 yr	1.49 (1.16–1.87)
Dialysis 3–4.9 yr	1.76 (1.19–2.62)
Dialysis ≥5 yr	2.22 (1.29–3.76)

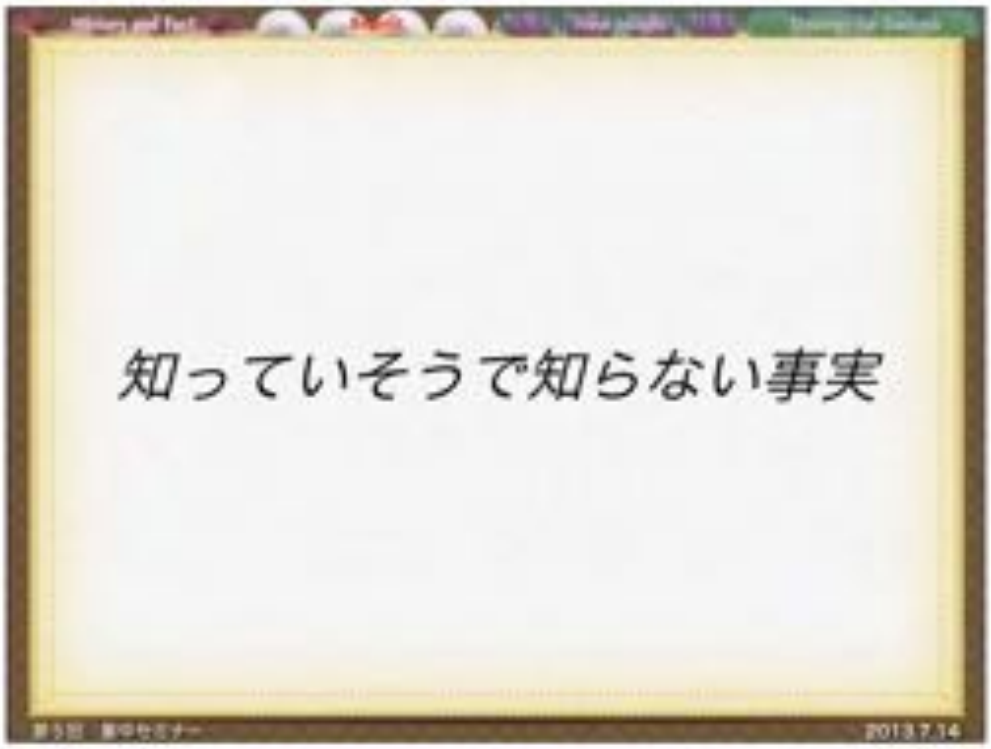
DGFC, death with a functioning graft.

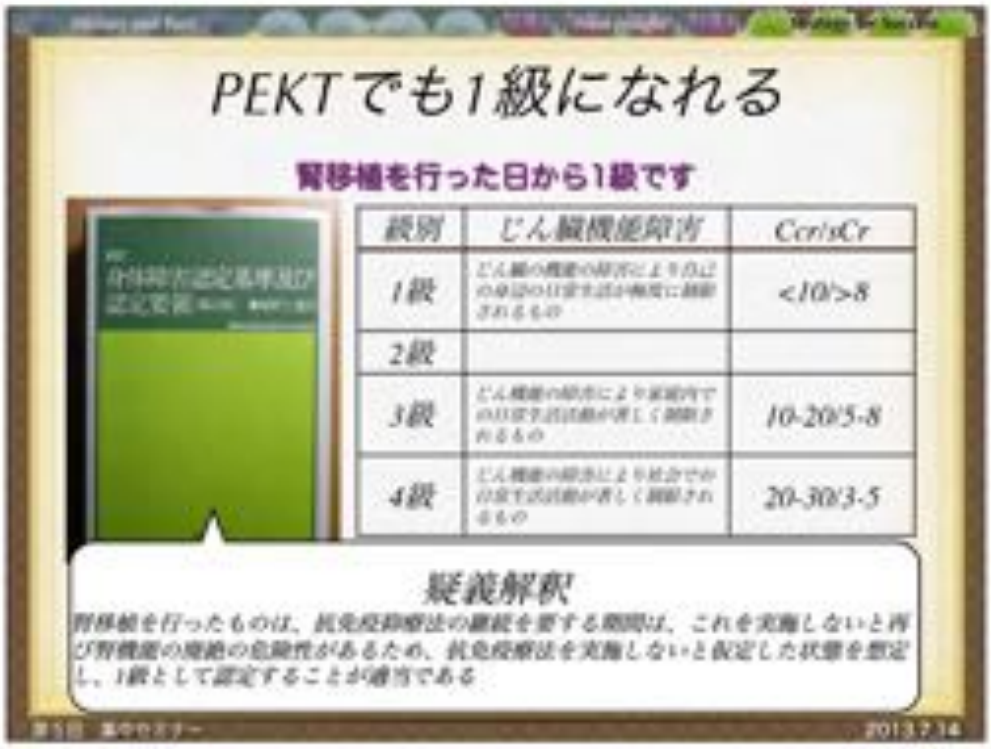
2nd KTxでもCSはPEKTの方が良い
2nd KTxでも透析が長いほどDGFCリスクが増加する

Transplantation 2013;95: 705–710)

Summary; New Insight

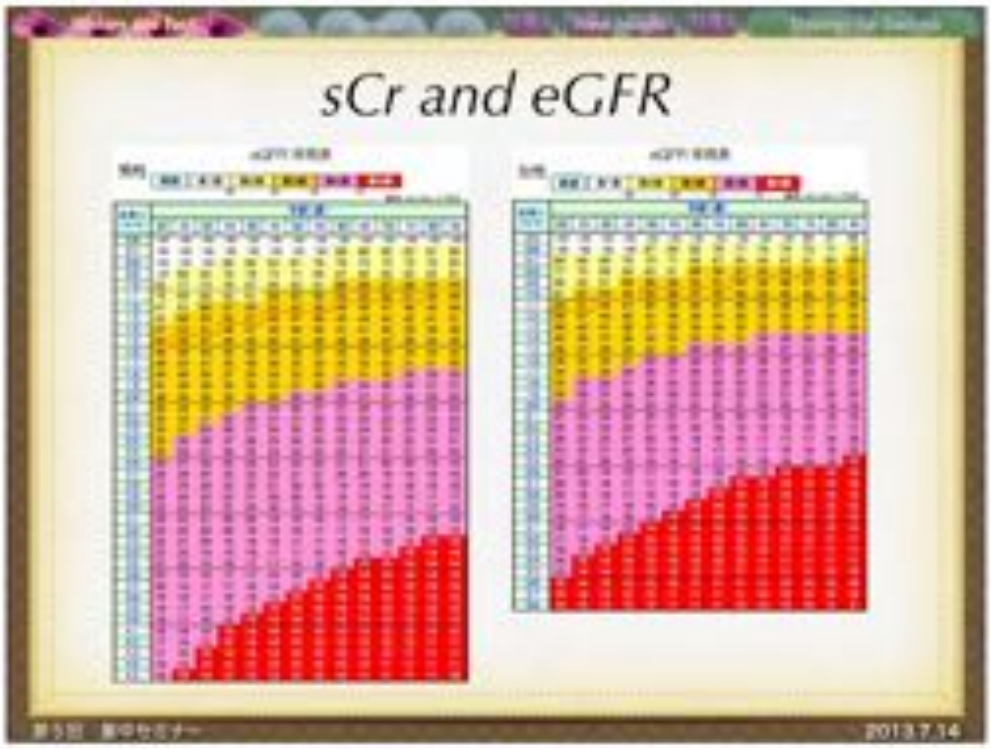
- ✓ 短期間の透析はGS/PSに影響しない
- ✓ 短期間の透析は移植腎機能にも影響しない
- ✓ 日本では献腎でのPEKTはほぼない
- ✓ 2nd KTxでもPEKTの方がGSが良い


知っていそうで知らない事実
2013.7.14

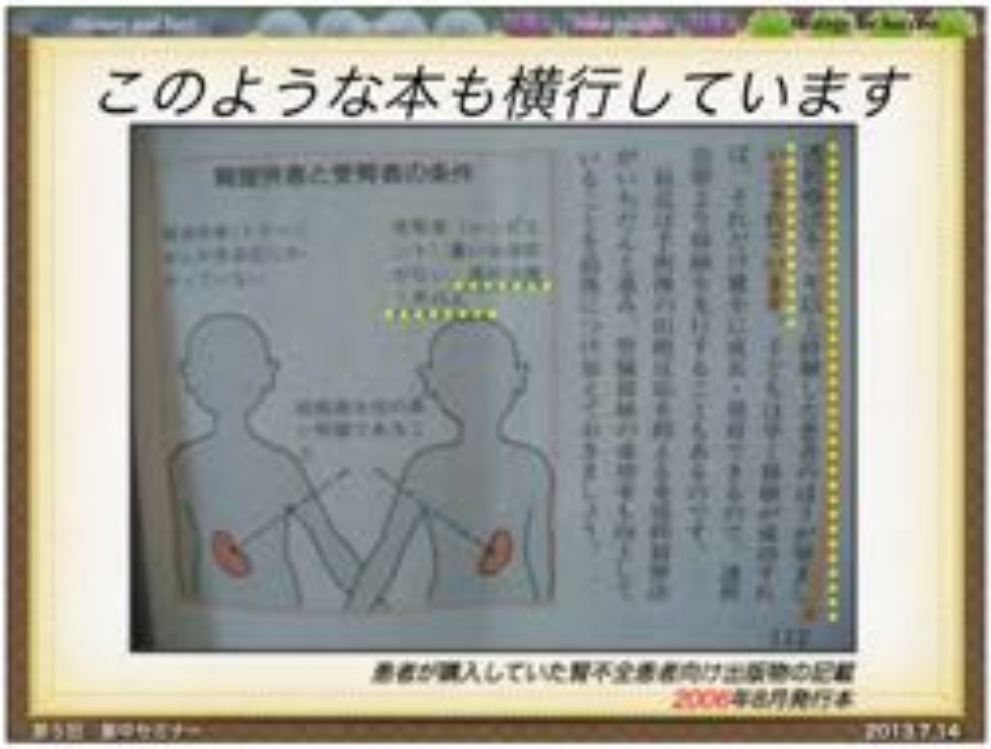

PEKTでも1級になれる
腎移植を行った日から1級です
級別
じん臓機能障害
Ccr/sCr
1級
<10/>8
2級
3級
10-20/5-8
4級
20-30/3-5
疑義解釈
2013.7.14


PEKTでも補助制度あり
保険証（3割負担など）
人工透析を受けている
特定疾病療養受療証
自己負担上限額が1万円までとなる
重度心身障害者医療費助成制度
※地域によって所得に応じて制限がある
人工透析を受けていない
身体障害者手帳の取得
（1・2・4級）
自立支援医療（更生医療）
※自己負担額最高1万円
※世帯の住民税額によって異なる場合がある
※重度心身障害者医療費助成制度によりさらに自己負担が軽減される場合がある
2013.7.14

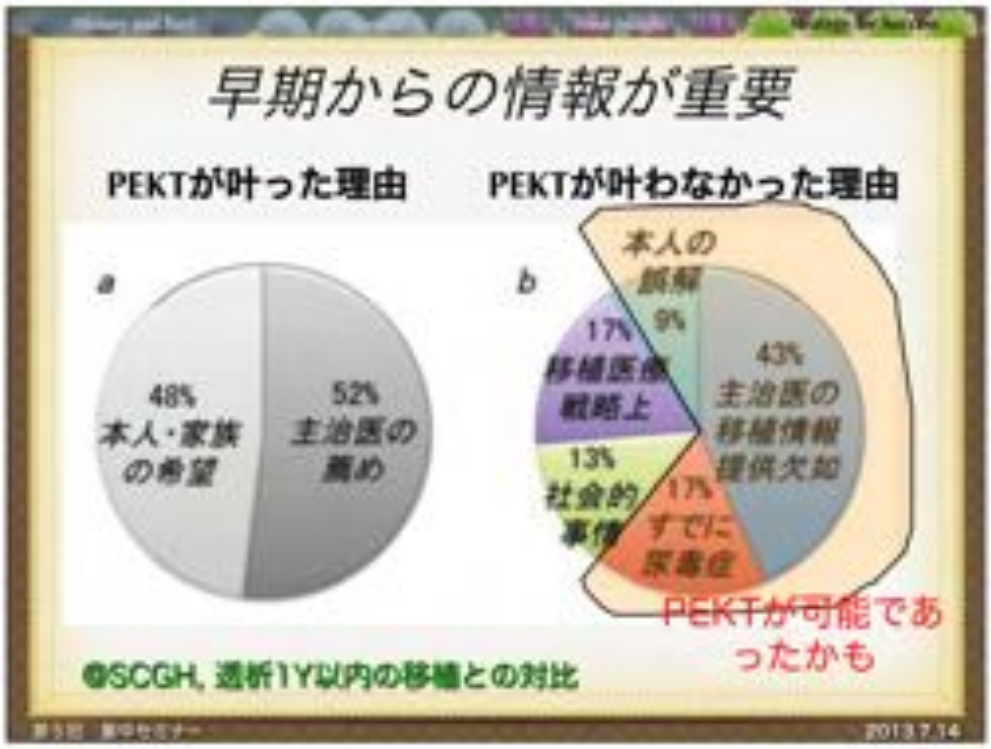

臨床家の誤解
2013.7.14

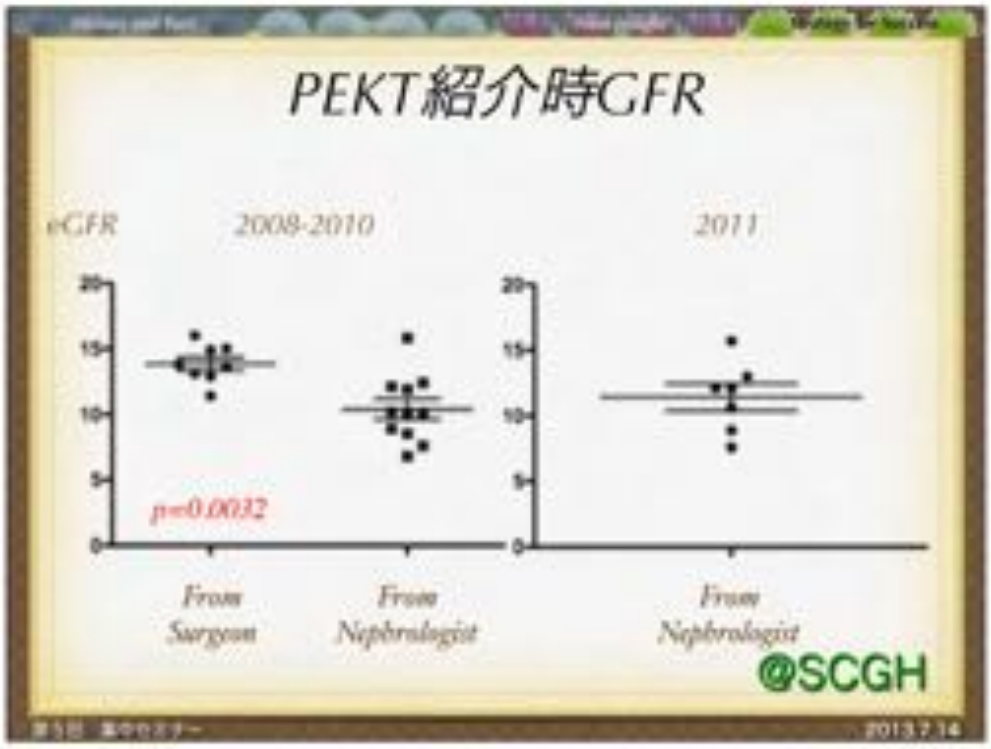

sCr and eGFR
2013.7.14

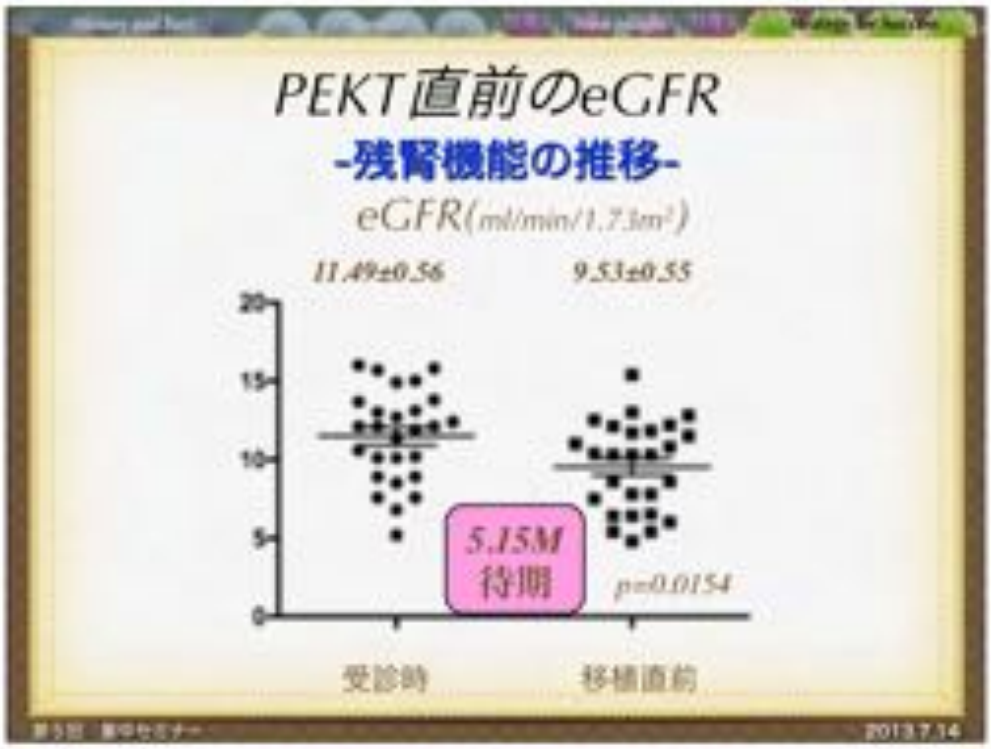

CKD保存期からPEKTへ
PETが良いのは知っているが
この患者さんに適しているか
いつ腎移植施設に紹介すべき
か
紹介してくれてありがたい
でももう少し早いほうが安全
なんでシャントがあるの？
NEPHROLOGIST
TRANSPLANT
SURGEON
隔たり？
意思のずれ？
認識の相違？
2013.7.14


このような本も横行しています
患者が購入していた腎不全患者向け出版物の記載
2006年8月発行本
2013.7.14


早期からの情報が重要
PEKT (n=8)
non-PEKT (n=61)
情報源
マスメディア
コメディカルスタッフ
情報入手の時期
腎移植の印象
2013.7.14


早期からの情報が重要
PEKTが叶った理由
PEKTが叶わなかった理由
a
48%
本人・家族の希望
52%
主治医の薦め
b
本人の誤解
9%
17%
移植医療戦略上
43%
主治医の移植情報提供欠如
13%
社会的事情
17%
すでに尿毒症
PEKTが可能であったかも
@SCGH, 透析1Y以内の移植との対比
2013.7.14


PEKT紹介時GFR
eGFR
2008-2010
2011
20
15
10
5
0
p=0.0032
From Surgeon
From Nephrologist
From Nephrologist
@SCGH
2013.7.14


PEKT直前のeGFR
-残腎機能の推移-
eGFR(ml/min/1.73m²)
11.49±0.56
9.53±0.55
20
15
10
5
0
5.15M
待期
p=0.0154
受診時
移植直前
2013.7.14


PEKTの実態調査
アンケートの配布
CKD担当医
腎移植施設
札幌腎疾患セミナー
参加の聴衆
2009年腎移植数上位
30位タイの施設
2013.7.14


PEKTの実態調査
CKD担当医 (回収率25/42, 59%)
PRTを勧めるGFR
PRTを勧めるsCr（大人）
37%
37%
26%
39%
61%
30を切ったら
20を切ったら
15を切ったら
3を越えたら
5を越えたら
透析会誌45(6): 459-466, 2012
2013.7.14


PEKTの実態調査
KTX担当医 (回収率31/31, 100%)
腎移植の予定はいつまで決定してますか？
現在の移植予定にPRTは予定されていますか？
8%
13%
69%
19%
81%
1か月先まで
3-6月先まで
7-12月先まで
1年以上先まで
予定されている
予定されていない
透析会誌45(6): 459-466, 2012
2013.7.14


PEKTの実態調査
KTX担当医 (回収率31/31, 100%)
PRTに対する施設の考え
19%
81%
積極的に行うべき
紹介があれば行う
まず透析を導入すべき
アクセス作成後のPRT例は？
10%
52%
10例ある
数例ある
ない
透析会誌45(6): 459-466, 2012
2013.7.14


PEKTの実態調査
KTX担当医 (回収率31/31, 100%)
PRTを希望する紹介時GFR<10以下の患者さんには
10%
23%
48%
決定している移植予定を変更
通常の移植予定日以外に何とかする
可能な関連施設を紹介する
まず透析をする
その他
透析会誌45(6): 459-466, 2012
2013.7.14


PEKTの実態調査
KTX担当医 (回収率31/31, 100%)
PRT希望者の初診時GFR？
そのうちPRT実施率は？
11%
26%
63%
20%
20%
40%
17%
3%
多くは15以下
15-19が多い
20以上が多い
80%>
60-79%
40-59%
20-39%
<20%
透析会誌45(6): 459-466, 2012
2013.7.14


PEKTの実態調査
KTX担当医 (回収率31/31, 100%)
CKD担当医に希望するPRTの紹介のタイミングはGFRで
26%
35%
>30
30-29
15-19
<15
透析会誌45(6): 459-466, 2012
2013.7.14

MSWの力も無視できない


AJKD
Original Investigation

Effectiveness of Educational and Social Worker Interventions to Activate Patients' Discussion and Pursuit of Preemptive Living Donor Kidney Transplantation: A Randomized Controlled Trial

PEKT実現のための現実

- ✓ PRTは本邦では献腎移植は非現実的
- ✓ 多くの施設では数ヶ月～数年先の腎移植の予約で埋まっている
- ✓ 駆け込み的なPRTは関係者の相当の努力が必要
- ✓ 早めの腎移植施設への受診が必要


日本の生体腎比率からすると
%PEKT
35%以上のPEKTが理想である!
86%
%LDKTX
2013.7.14

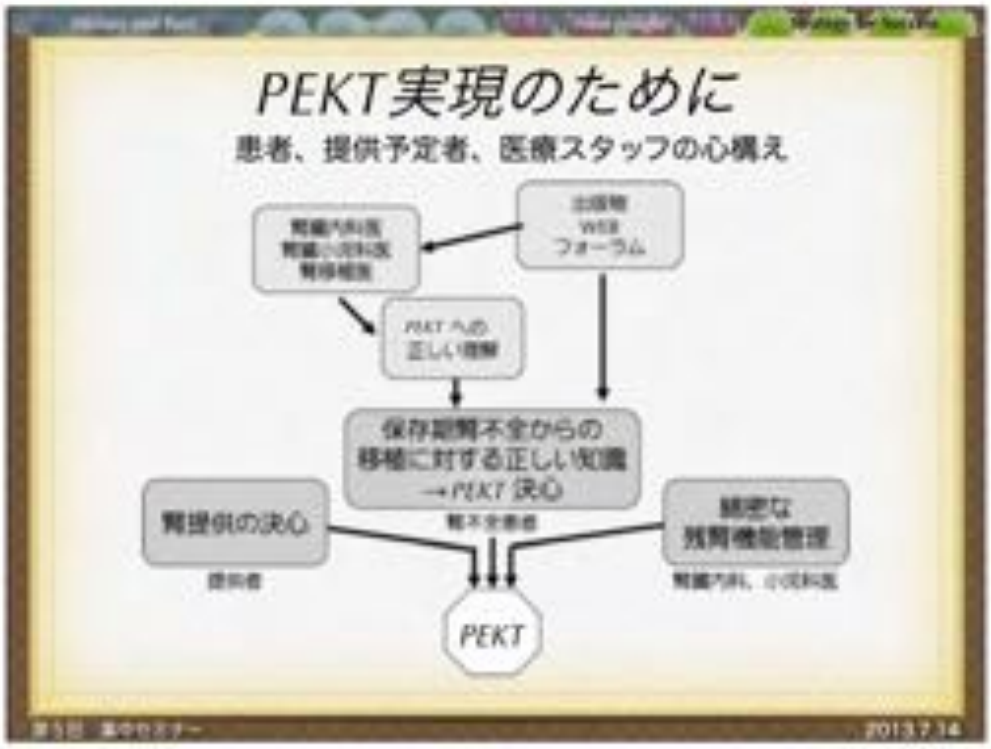

PEKT実現のために
患者、提供予定者、医療スタッフの心構え
PEKT
2013.7.14

Table 2 Weighing the preemptive transplant decision: advantages and risks

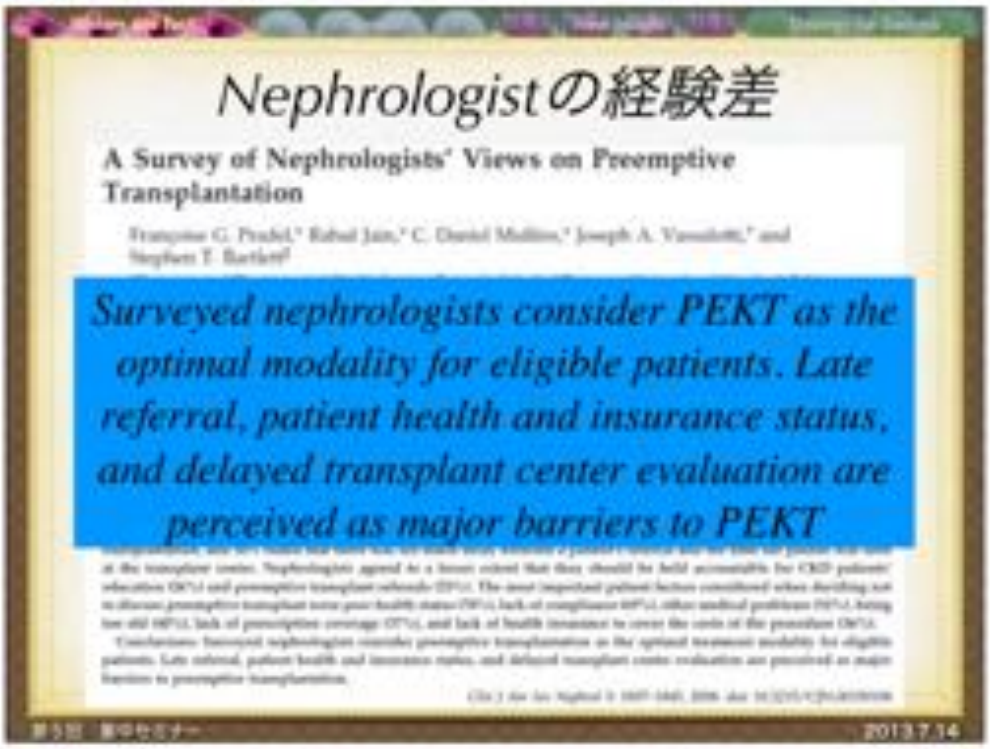
Transplant vs. dialysis?
With transplant:
- Have better filtering of wastes because 1 transplanted kidney approximates 50% to 80% of the work of 2 kidneys while dialysis approximates only 10% to 15%
- Avoidance of dialysis-related infections and health problems
- Generally live longer with a transplant than remaining on dialysis
- More quality-of-life advantages: Freedom from regular dialysis treatments, ability to travel with less restrictions, lower rates of depression, sleep problems, and sexual dysfunction
- No dietary and liquid restrictions for kidney reasons
- Greater ability to maintain employment, thus maintaining health insurance

Living donation vs. deceased donation?
With living donation:
- Have to find a family member or friend who would be a donor
- Increase chance of finding a matching kidney during an organ shortage
- Can receive a kidney more quickly because do not have to wait on the waiting list
- Can plan a transplant to be most convenient to recipient's health and donor's schedule
- Have greater chance of the kidney lasting longer than a deceased donor transplant

Preemptive transplant vs. transplant after starting dialysis?
With a preemptive transplant:
- Have to find a family member or friend who would be a donor
- Kidneys generally last longer than with any other type of transplant
- Patients generally live longer with preemptive transplants than if they get transplants after starting dialysis
- Since patients still have some kidney function, they are healthier when undergoing surgery
- Patients experience less stress because they do not need to start and learn multiple treatment techniques

Risks to recipients?
- Risk of death from surgery, primarily due to the risk of anesthesia: <1%, 1 in 3000
- Risk of surgical problems including infections, fever, bleeding, and blood clots: <3%
- Risk of kidney failing in the first year: 5% to 10%
- Immunosuppressant drugs may not be covered after 3 years

Risks to living donors?
- Risk of death from surgery, primarily due to the risk of anesthesia: <1%, 1 in 3000
- Risk of problems for living donors: infections, fever, bleeding, blood clots, hernias, nerve damage, damage of other organs
- Living donor has a slightly increased risk of elevated blood pressure after donating
- Living donors who lose their remaining kidney in the future would be given priority on the deceased donor waiting list


Nephrologistの経験差
A Survey of Nephrologists' Views on Preemptive Transplantation
Surveyed nephrologists consider PEKT as the optimal modality for eligible patients. Late referral, patient health and insurance status, and delayed transplant center evaluation are perceived as major barriers to PEKT
2013.7.14


Nephrologistの経験差
2013.7.14

Early referralを妨げる要因

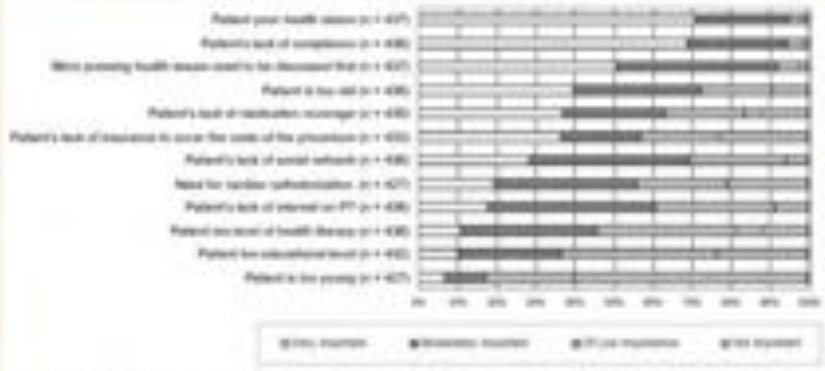
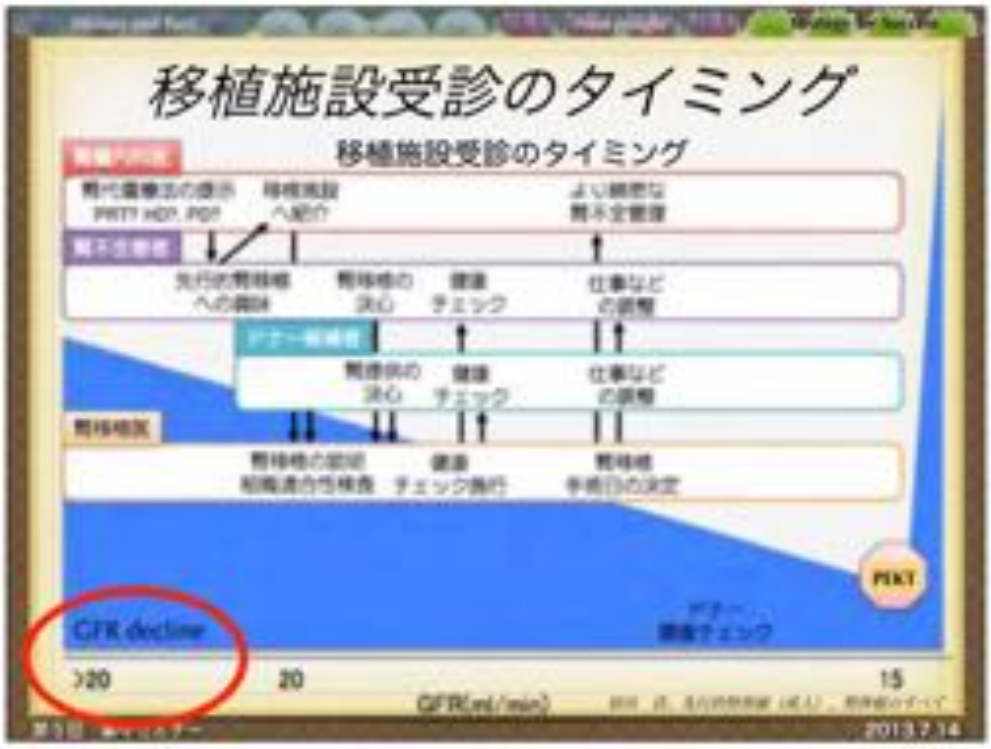


Figure 1. Factors contributing to delayed discussion about preemptive kidney transplant.

先行的献腎移植登録


先行的献腎移植登録
2013.7.14


移植施設受診のタイミング
移植施設受診のタイミング
PIRT
CFR decline
>20
20
15
GFR(ml/min)
2013.7.14

Summary; Strategy for Success

- ✓ もともと行われていたKRT
- ✓ 1990年ころからの概念
- ✓ 日本においては15-20%がPEKT
- ✓ 日本では献腎でのPEKTはほぼない
- ✓ 地域差がある

☑ Conclusion

PEKTまとめ

- ✓もともと行われていたKRT
- ✓1990年台はGS/PSが優れていた
- ✓日本においては15-20%がPEKT
- ✓種々のメリットがある
- ✓増加のためには患者、医療者の啓発が必要
- ✓献腎ドナーの爆発的な増加に期待

2013.7.14

ご静聴ありがとうございました

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中村美智子、田邉起、大堀加奈子、佐々木元、石崎淳司、
千葉博基、川口愛、大石悠一郎、横口はるか

各病院の腎臓内科、内科、小児科の皆様

2013.7.14