Robotic Kidney Transplant in Obese Recipients: State of the Art

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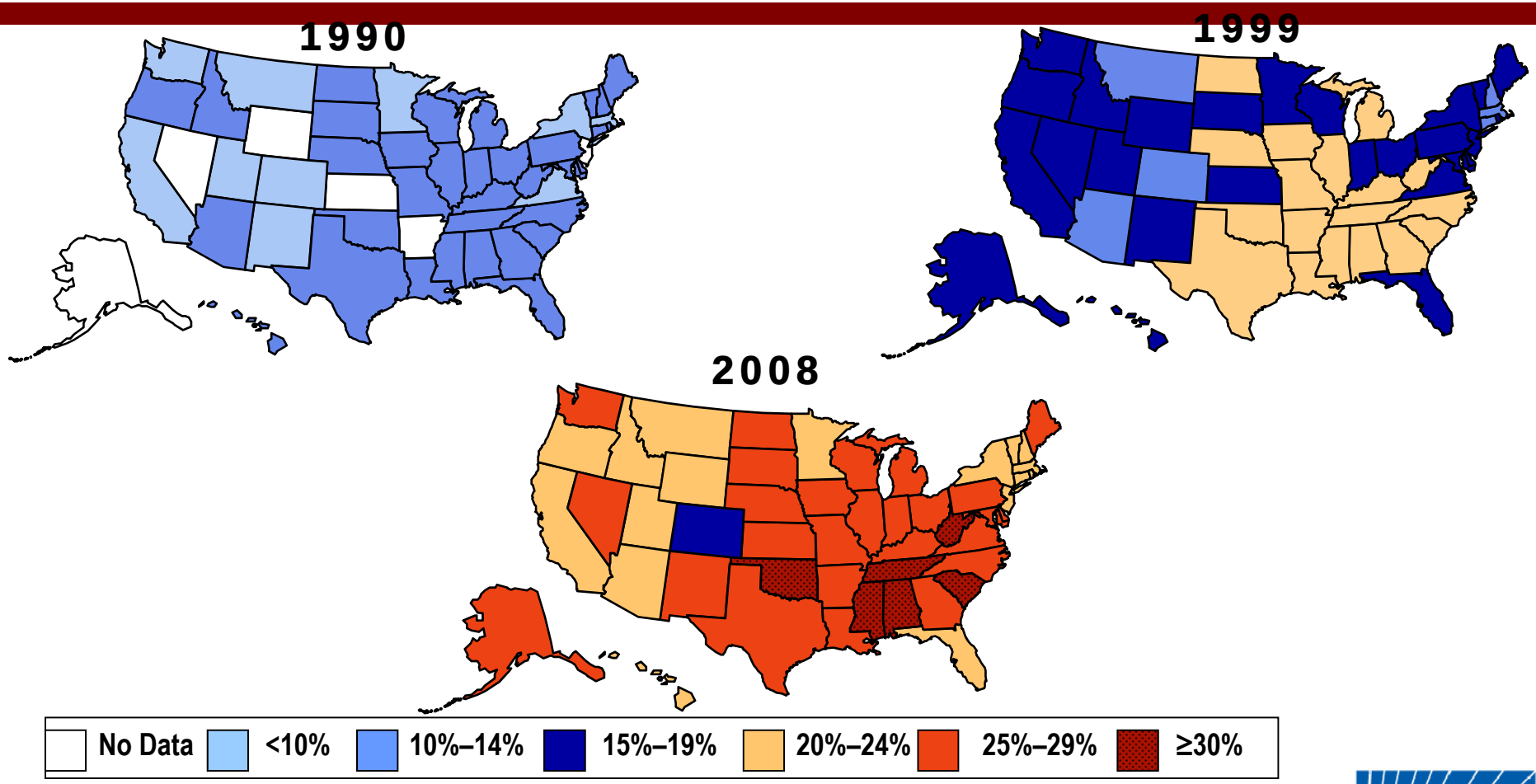
Obesity Trends* Among U.S. Adults
BRFSS, 1990, 1999, 2008

(*BMI ≥30, or about 30 lbs. overweight for 5'4" person)



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Source: CDC Behavioral Risk Factor Surveillance System.

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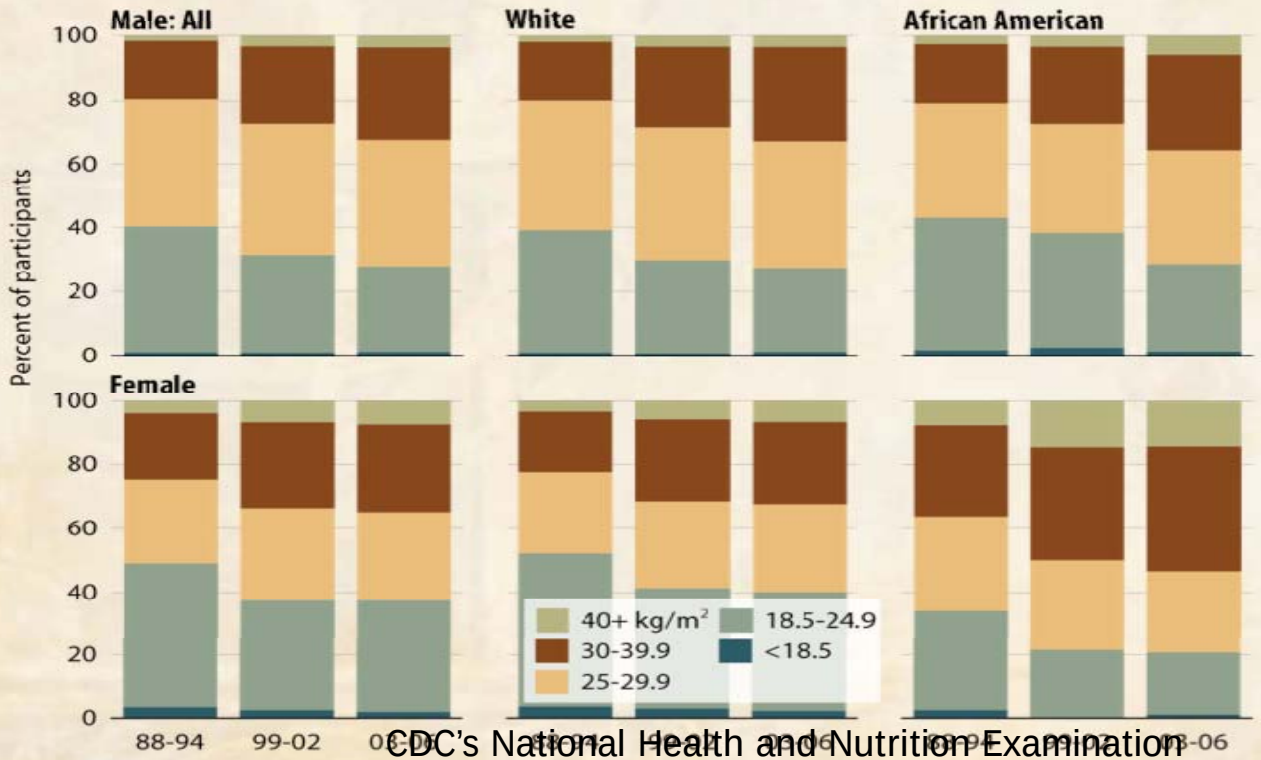
How frequent is obesity in ESRD?

NHANES participant distribution, by body mass index, gender, & race

Figure 1.19 (Volume 2)



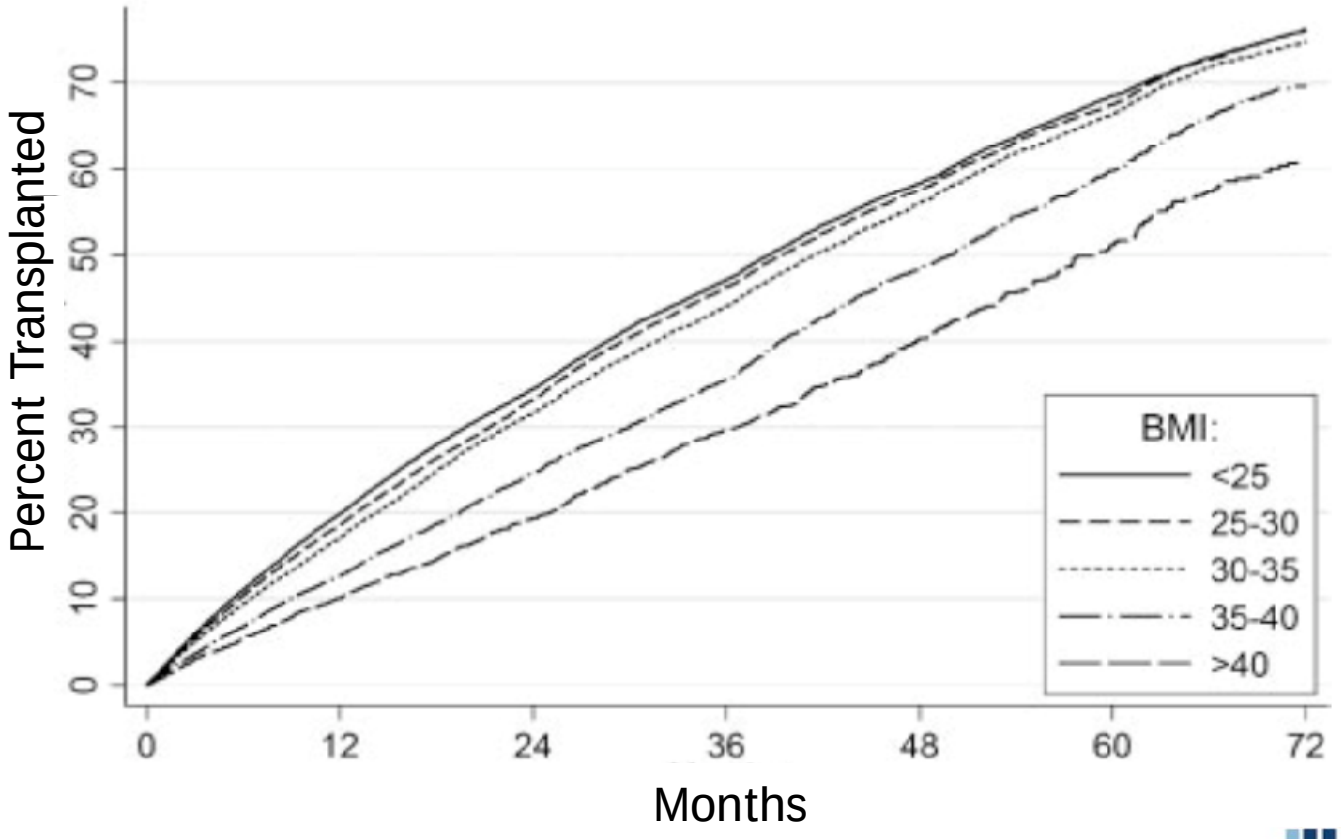
NHANES participants age 20 & older.

USRDS 2009 ADR

CDC's National Health and Nutrition Examination Surveys (NHANES)

USRDS

BMI and list wait time



J Am Soc Nephrol 19: 349–355, 2008

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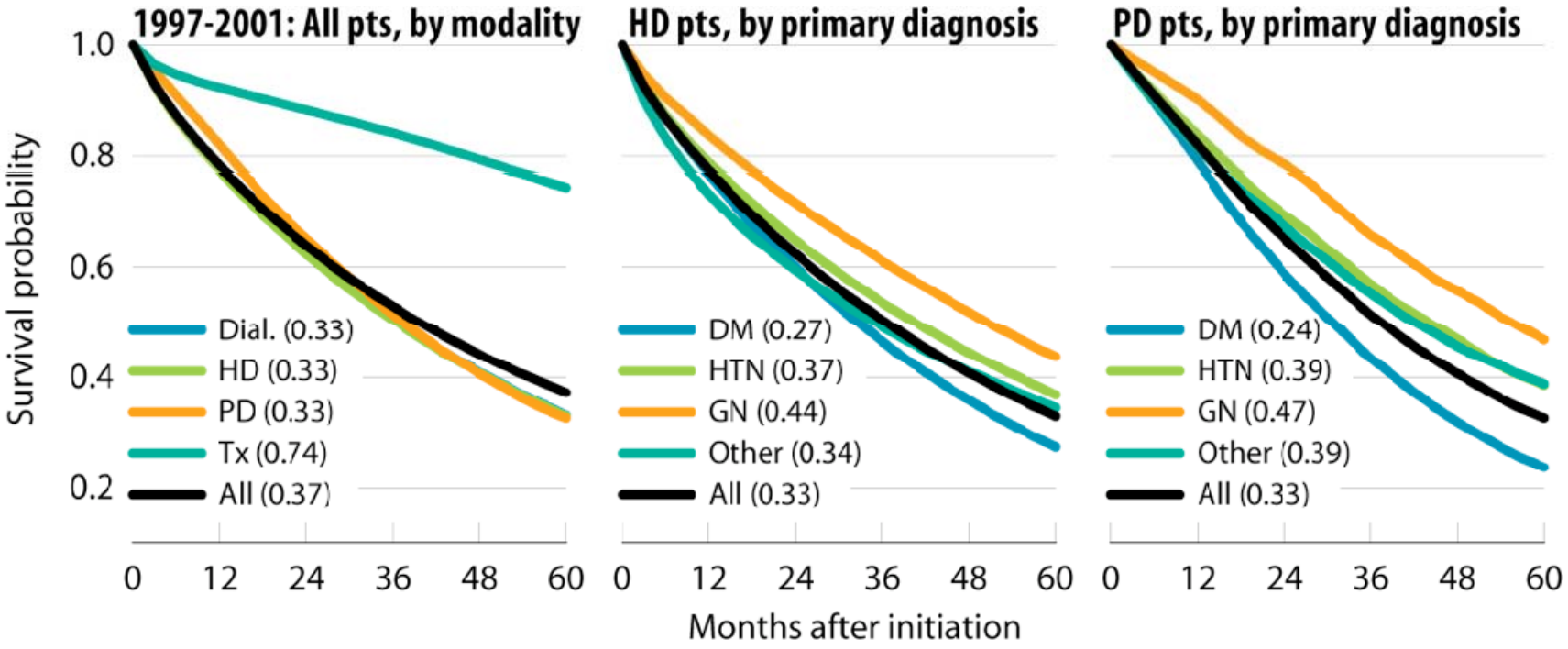
Adjusted five-year survival, by modality & primary diagnosis: 1997-2001

Figure 6.10 (continued; Volume 2)



incident dialysis patients & patients receiving a first transplant in the calendar year. All probabilities adjusted for age, gender, & race; overall probabilities also adjusted for primary diagnosis. All ESRD patients, 2005, used as reference cohort. Modality determined on first ESRD service date; excludes patients transplanted or dying during the first 90 days. Five-year survival probabilities noted in parentheses. Dialysis patients followed from day 90 after initiation; transplant patients followed from the transplant date.

Obesity, Surgical Site Infection, and Outcome Following Renal Transplantation

Raymond J. Lynch, MD, MS, David N. Ranney, BS, Cai Shijie, MS, Dennis S. Lee, BS, Niharika Samala, MD, and Michael J. Englesbe, MD

Annals of Surgery • Volume 250, Number 6, December 2009

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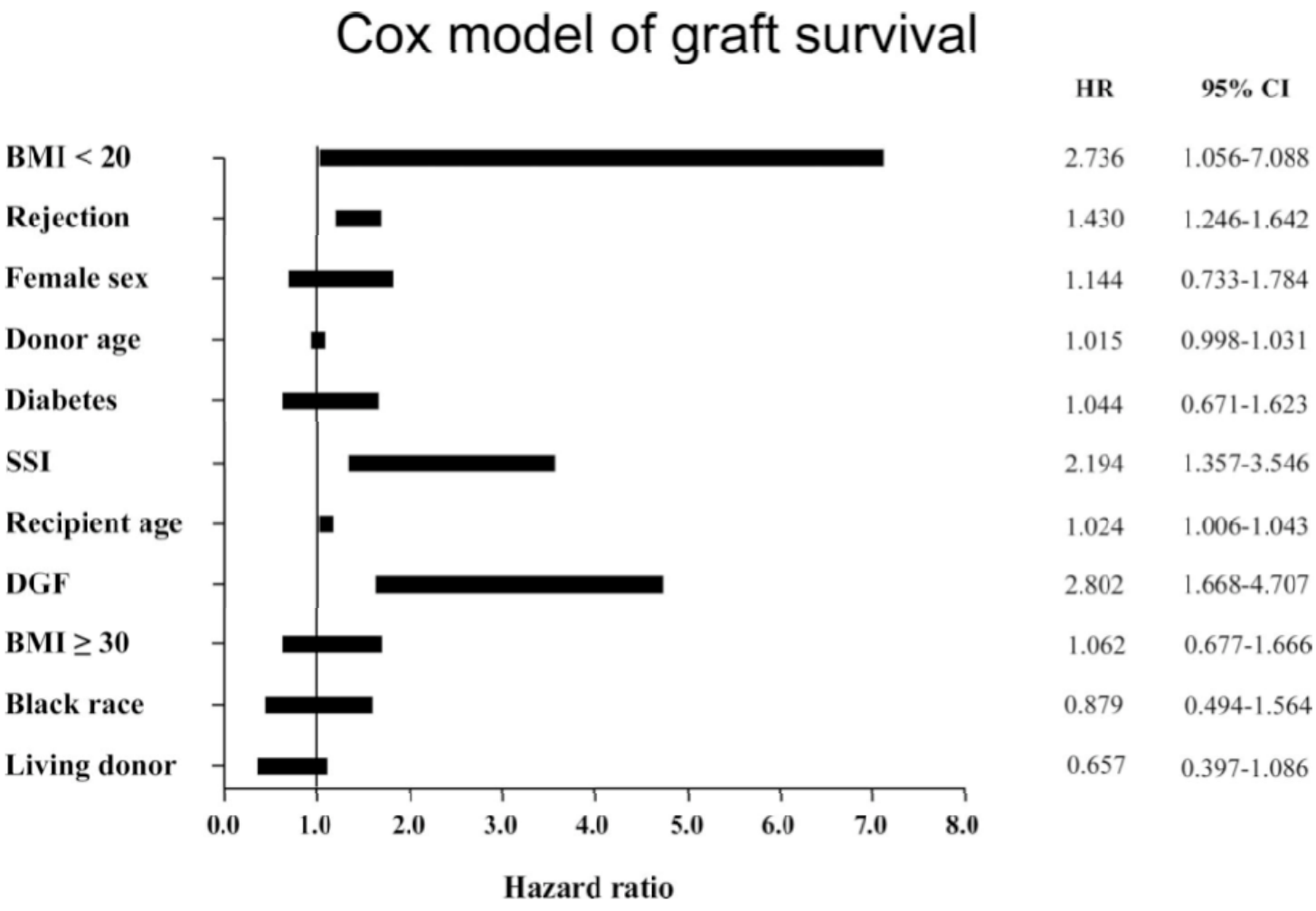
What impacts graft survival?



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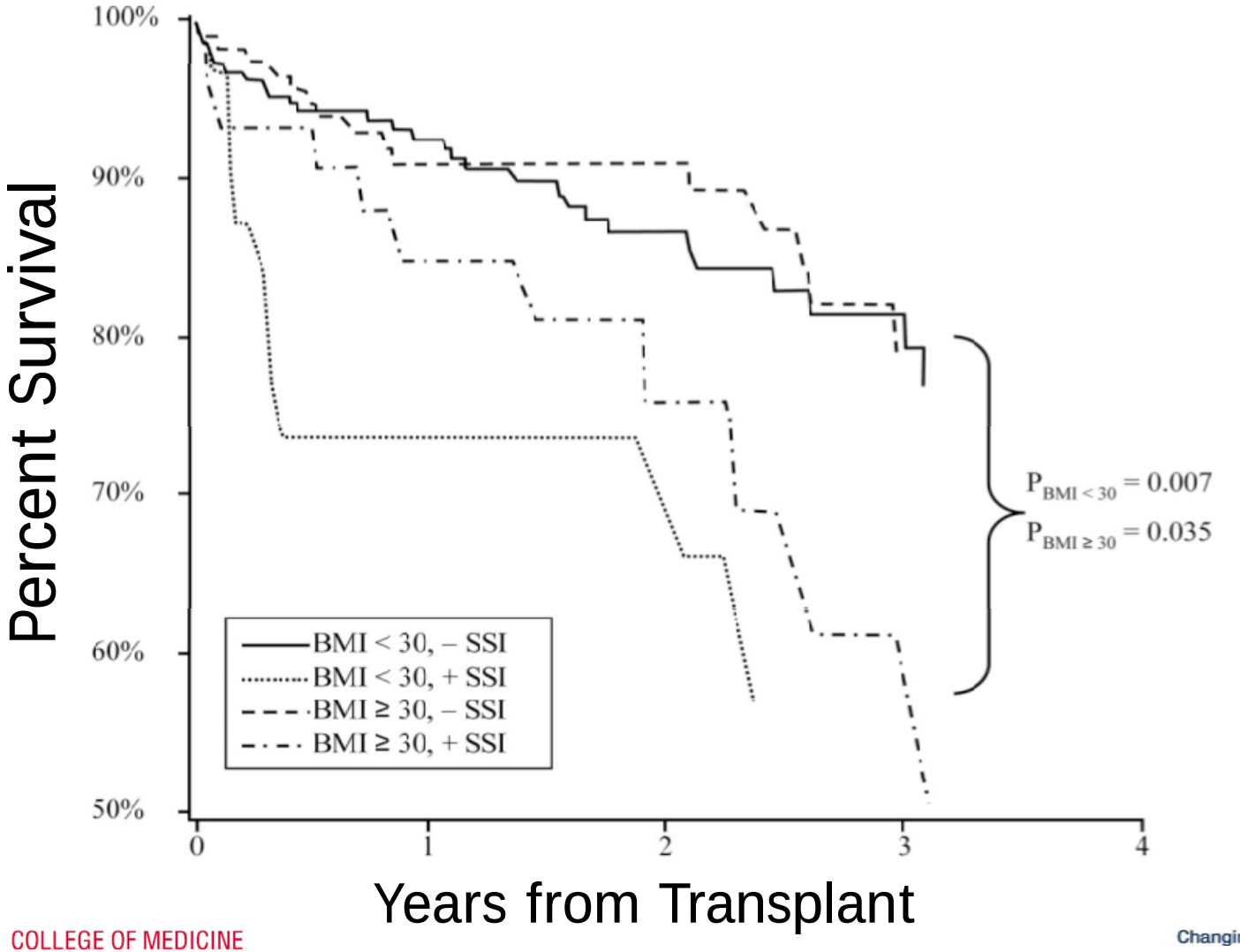
SSI and graft survival



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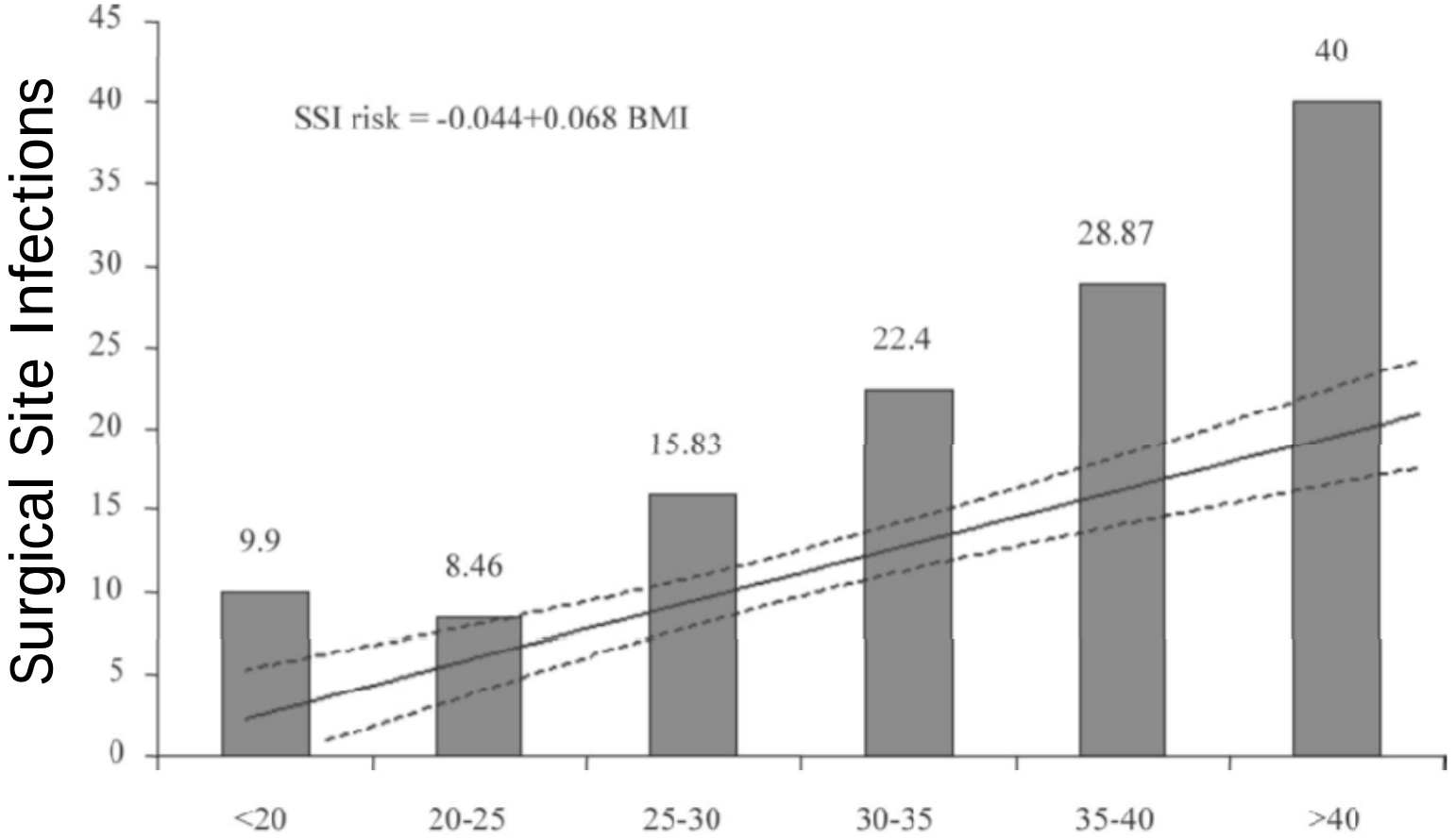
BMI and risk for SSI in kidney tx



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Hypothesis

- Minimizing surgical trauma by using robotic technology could reduce wound infections and improve outcomes of kidney transplantation in obese recipients

Robotic Transabdominal Kidney Transplantation in a Morbidly Obese Patient

Giulianotti P, Gorodner V, Sbrana F, Tzvetanov I, Jeon H, Bianco F, Kinzer K, Oberholzer J, Benedetti E.

Am J Transplant. 2010

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Study Outline

- All living donor kidney transplant candidates with BMI >30 were offered the option for robotic surgery (no one declined)
- The willing recipients were all accepted regardless sensitization, history of previous abdominal surgery or history of previous kidney transplant

Immunosuppression

- Low Risk (primary kidney transplant in non-African American recipients with PRA less than 30)
  - Simulect induction
  - Tacrolimus – MMF
  - Steroids off POD #5

Immunosuppression

- High Risk
  - Thymoglobulin induction x5 doses
  - Tacrolimus/MMF
  - Steroid off POD #5
- Cross match positive/ABO incompatible treated with plasmapheresis/IVIg according to our standard protocol

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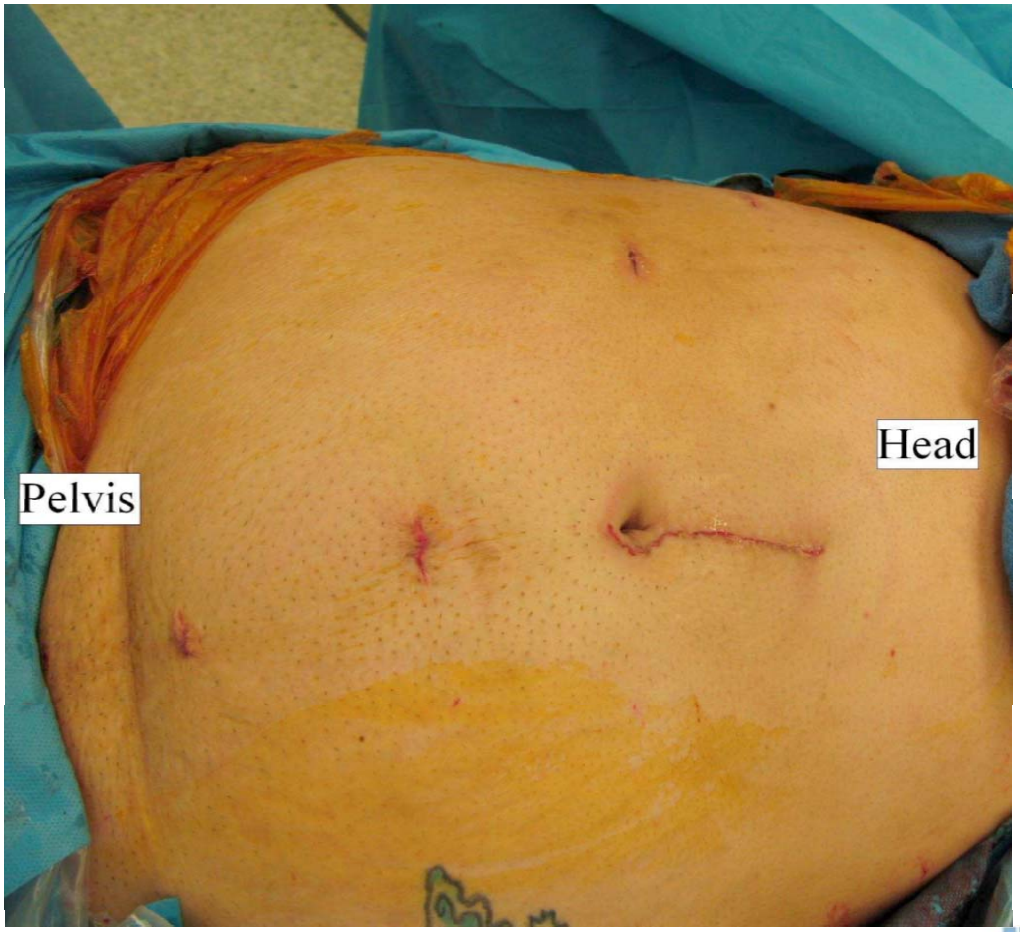
The End Results



Results

- Between January 2010 and August 2011, 34 patients with BMI >30 were considered
- 31 fully robotic kidney transplants were performed (29 living donor, 2 cadaver donor)
- 3 cases converted to open
  - 2 due to extensive adhesions (after laparoscopic exploration)
  - 1 due to clamp injury of common iliac artery needing iliac vascular reconstruction

Demographics

Age	**47.5 +/- 8.4**
Gender (M/F)	63% / 37%
Race (C/AA/H)	10.5% - 52.6% - 36.8%
BMI	44.1 +/- 6.9 (range 33-58)
Cross-match positivity	37%

Peri-Operative Outcomes

Cold Ischemia Time (living donor)	**2.6 +/- 2.5 hours**
Warm Ischemia Time (living donor)	46 +/- 8 minutes
Blood loss	129 +/- 64 cc

Co-Morbidities

Hyperlipidemia	53 %
Diabetes	42 %
Hypertension	74 %
CAO	31 %
Sleep Apnea	26 %

Results

- Patient and graft survival to date, all the recipients are alive with functioning kidney, except one who died of line sepsis two weeks post-operatively with perfectly functioning graft
- The 1 year patient and graft survival is therefore 97%

- OR time -270 min
- CIT 1.12(0.6 – 9.6) hours
- WIT – 4.8 (3.2-5.8) minutes
- Creatinine normalized day: 4(2-13 days)
- Full mobilization day :1.95 (1-2 days)
- Length of stay :6 (4-21)
- EBL :62.5 (20-200)

Complication in robotic group

- Wound infection 5% - 1 patient
- Respi complication 5% - 1 patient
- DVT/PE 5%
- Rejections : 4/20 (20%)

Biopsy and Rejections

Biopsy-proven

- Rejections – 4 (3 humoral and one cellular)
- Two had high PRA and one was positive cross match

High risk

- High PRA – 4
- Positive cross match - 3
- 7 cases

Robotic versus Open Kidney Transplant in Obese Recipients

- Robotic KT group (group 1=20) and conventional living donor KT group (group 2, N=55) with similar high BMI performed in the same time frame

Clinical Outcomes

- Immediate graft function in all recipients with no case of acute tubular necrosis
- No vascular/urological complications
- Length of stay 8 days +/- 5.2 (duration of hospital stay function of the cross-match positive cases)

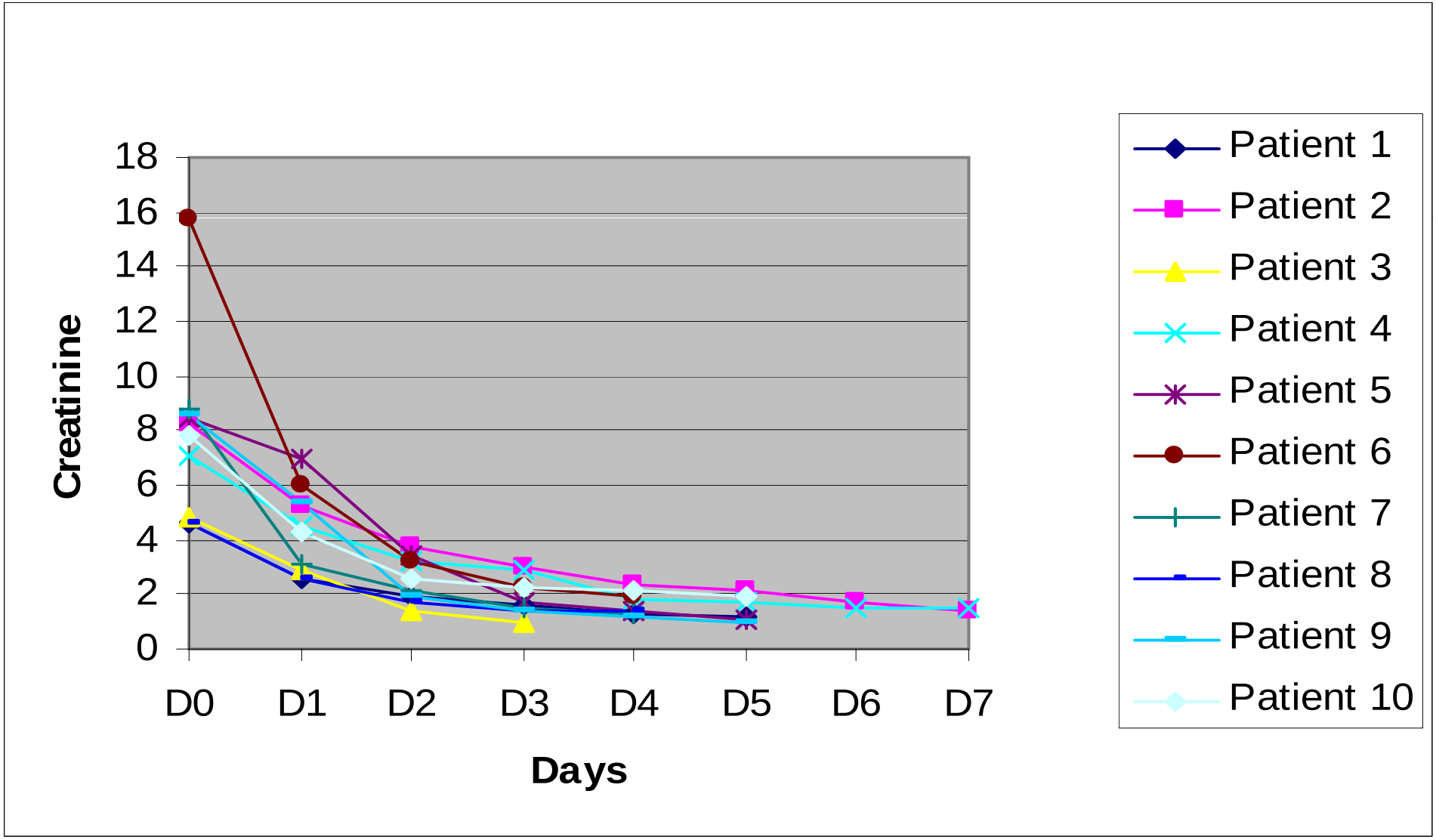
Complications

Wound infection	1/31 (3%)
Pneumonia	1/31 (3%)
Line sepsis	1/31 (3%)
Acute rejection	4/31 (12%)

Post-transplant Renal Function

- Creatinine at discharge 2.0 +/- 1.6
- Last creatinine value at average 9 +/- 5 months follow up 1.4 +/- 0.4

Results


Creatinine
18
16
14
12
10
8
6
4
2
0
D0
D1
D2
D3
D4
D5
D6
D7
Days
Patient 1
Patient 2
Patient 3
Patient 4
Patient 5
Patient 6
Patient 7
Patient 8
Patient 9
Patient 10

Conclusion

- Our preliminary results suggest that fully robotic kidney transplant in morbid obese recipients is a successful strategy
- The procedure is associated with low rate of superficial wound infections, possibly improving patient and graft survival
- Long-term follow-up data will be necessary to confirm the value of this approach