Prevalence and determinants of nonadherence with immunosuppressive regimen in adult renal transplant recipients

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Funded by Swiss National Science Foundation (nr 4046-58697)

1. Conclusion

Prevalence:
- Overall electronically monitored (EM) nonadherence with immunosuppressive medication was low in our sample kidney transplant patients (KTx), approaching 100% for the median patient (n=249; largest EM sample ever in KTx)
- still, an important subsample of patients showed severe nonadherence

Determinants:
We detected several patient and therapy related variables associated with nonadherence, allowing identification of patients at risk and development of adherence enhancing interventions.

2. Aim of the study

- Few studies exist using electronic monitoring to measure nonadherence with immunosuppressive medication in renal transplant patients
  ➔ A first aim of the study was to determine period prevalence of nonadherence with the immunosuppressive regimen
- Few studies comprehensively investigated determinants / correlates of nonadherence with immunosuppressive medication in renal transplant patients (patient, therapy, condition, health care system related and socioeconomic factors)
  ➔ A second aim of the study was to screen for determinants / correlates of nonadherence with immunosuppressive drugs

3. Methods

Design: Prospective cohort study

Determinants
Nonadherence period prevalence:
- Electronic Monitoring: 3 months (minus first 35 days)
Months

Sample
Inclusion criteria:
- followed-up in Basel or Aarau (Switzerland)
- over 18 years and > 1 year post KTx
- on immunosuppressive medication
- independent medication management
- German/French speaking
- able to read (with or without glasses)
- mentally clear
- literate

Sample profile:
- 413 patients asked
- 57 refusals (13.6%)
- 356 included (86.2%)
- 291 with EM* (61.7%)
- 65 without EM (18.3%)

Sample profile:
- 18 drop-outs (6.0%)
n=273 (94.0%)

Electronic measurement of nonadherence

Period prevalences
- Taking adherence: (# taken doses / # prescribed doses) * 100
- Dosing adherence: (# correctly dosed days / # days monitored) * 100
- Timing adherence: (# correct interdose intervals* / # openings) * 100
- Drug holidays: no medication intake for >48h (1x/d); >24h (2x/d)

Measured nonadherence determinants

Health care system & HC team:
- Center
- Regularity follow-up

Condition related:
- Depressive symptoms
- Coping styles
- Self-efficacy
- Health behaviors
  (former nonadherence, vaccination & alternative med.)
- Busyness & routine in life style

Socio-economic:
- Age & gender
- Nationality
- Living alone/together
- Received social support
- Employment/education
- Perception financial sit.

Therapy related:
- Time on dialysis / with Tx
- Dialysis mode / Pre-emptive Tx
- # of transplants received
- Graft type
- Complexity medication regimen
- Symptom occurrence & -distress
- Therapy changes
- Use of medication aids

Data analysis

1. Excluding the first 35 days because an intervention effect of the electronic monitoring on adherence was observed
2. Screening of all determinants by simple random intercept logistic regression analyses based on a binary longitudinal sequence representing daily dosing adherence (=0) or nonadherence (=1).
3. Adapting p-values for multiple-testing
4. Putting all significant variables in a multiple model

4. Results

Period prevalences
- Taking adherence: 100% (IQR 1.3; range: 47-110%)
- Dosing adherence: 100% (IQR 3.6; range: 23-100%)
- Timing adherence: 98% (IQR 6.8; range: 18-100%)
- Drug holidays: 0 (IQR 1.1; range: 0-29)

Determinant analyses

The analysis detected more nonadherence in:
- patients showing a low self-efficacy with medication taking
- patients having a weak belief that the drugs are needed to keep the kidney
- patients experiencing spots in the face
- patients not using a pill-organizer
- patients having higher self-reported nonadherence
- when later in the week (nonadherence increased gradually from Monday until Sunday)