

# Association between mortality and glycaemic control (GC) in a large Swiss haemodialysis cohort

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## Background and Aims

Diabetes is the leading cause for end stage renal disease (ESRD) and initiation of renal replacement therapy (RRT) of which haemo-dialysis (HD) is most prevalent. The Dialysis Outcomes and Practice Patterns Study (DOPPS) as well as others have shown a clear link between poor glycaemic control (GC) and early mortality. There is scant information available in Swiss HD patients regarding prevalence outcomes for diabetic patients.

## Methods and study design

- A prospective, dynamic, 3 year follow up study of HD-patients from 6 centres in Switzerland (*monitor!*-cohort).
- GC was assessed from HbA1c results that were then further adjusted for haemo-globin (Hb) and albumin (Alb) based on a formula by Hoshino et al. (2014).
- Biochemical data was collected from routine annual reviews.
- To enable comparison with published data, GC was divided into 3 risk categories, increased risk with low HbA1c  $\leq 5.9\%$ , no risk with HbA1c 6.0-7.9%

## Results

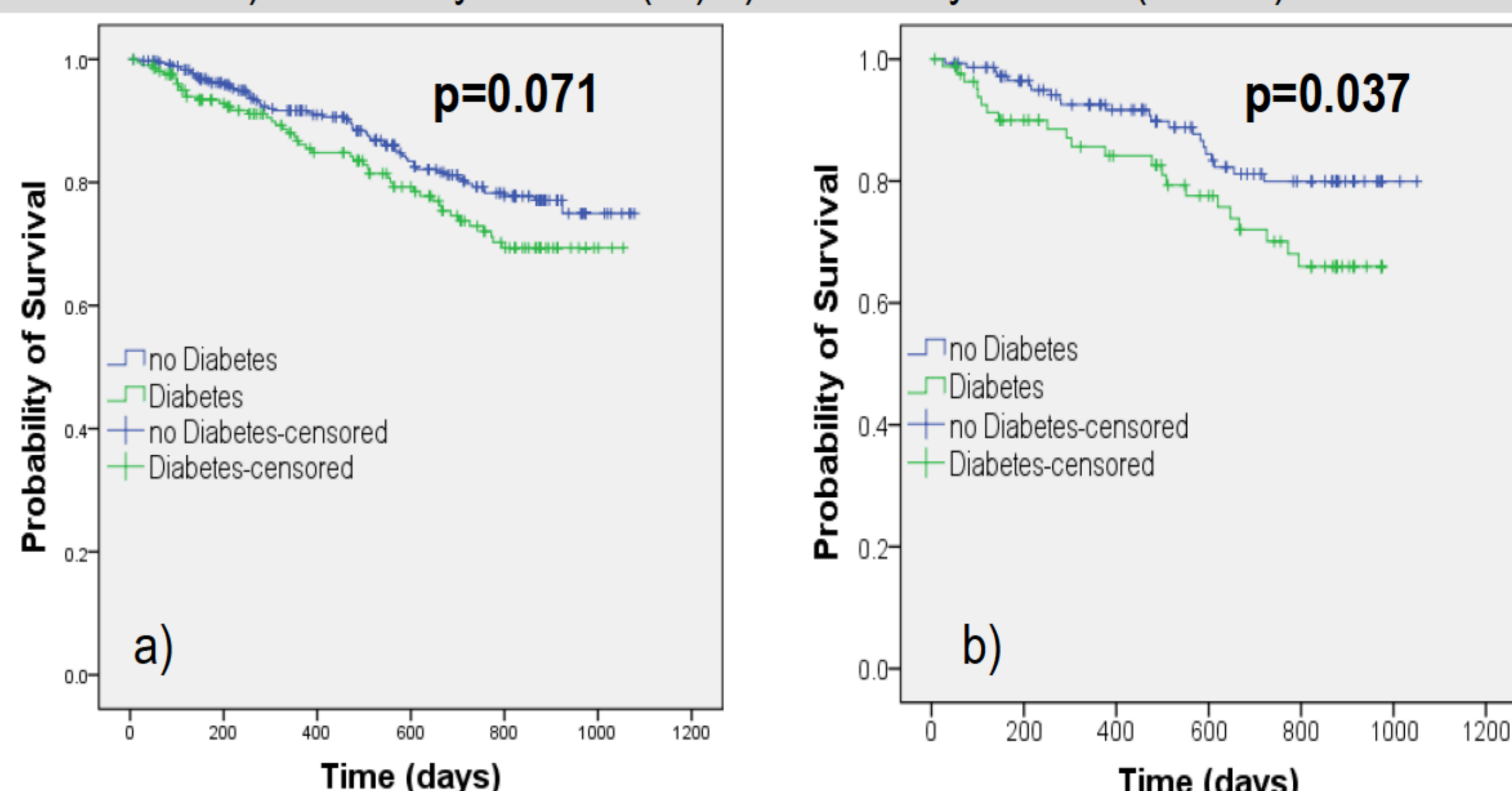
Table 1: General characteristics of the study population

Variable	Diabetes n=207	No Diabetes n=358	P Value
<b>Demographic</b>			
Age (yrs)	71 (61-78)	70 (56-78)	0.157*
Female sex % (n)	41 (84)	40 (147)	0.910**
Dialysis vintage (yrs)	2.8 (1.3-4.9)	3.6 (1.7-6.1)	0.003
Charlson Score (adjusted for DM)	3.4 ( $\pm 1.6$ )	3.3 ( $\pm 1.6$ )	0.556
BMI (kg/m <sup>2</sup> )	25.4 ( $\pm 6.7$ )	26.8 ( $\pm 6.5$ )	0.025
<b>Biochemistry</b>			
Haemoglobin (g/l)	111 ( $\pm 14$ )	114 ( $\pm 13$ )	0.017
Potassium (mmol/l)	4.9 ( $\pm 0.8$ )	5.0 ( $\pm 0.7$ )	0.194
Calcium (mmol/l)	2.20 ( $\pm 0.17$ )	2.24 ( $\pm 0.20$ )	0.020
Phosphate (mmol/l)	1.61 ( $\pm 0.43$ )	1.61 ( $\pm 0.45$ )	0.956
Albumin (g/l)	38 ( $\pm 4.4$ )	40 ( $\pm 4.1$ )	0.000
CRP (mg/l)	3.5 (1-10)	5 (4-14)	<0.001*
PTH (ng/l)	237 (153-401)	248 (114-438)	0.680*
Kt/V	1.58 ( $\pm 0.28$ )	1.68 ( $\pm 0.33$ )	0.001

\*Mann-Whitney test \*\*Chi-squared test

Out of 565 patients assessed 37% (n=207) had diabetes. Cox regression suggested a trend for presence of diabetes and mortality with HR 1.35 that was not significant (p=0.128; CI 95% 0.917-1.978). There was a trend in mortality with gender and diabetes with female HR 1.63 (CI 0.89-2.98) and male HR 1.20 (CI 0.72-2.01) which was not significant at p=0.11 and p=0.48, respectively. Within the diabetic cohort there was a trend for patients in the "at risk" hbA1c categories (<5.6%  $\rightarrow$  >7.9%) of HR 1.2 and 0.67 for original HbA1c results and HbA1c results adjusted for Hb/Alb respectively, which were not significant (p=0.576; CI 95% 0.659-2.120 and p=0.390; CI 95% 0.263-1.686).

Figure 1: Kaplan Meier plot: Survival according to stratification by a) Diabetes yes or no (all) b) Diabetes yes or no (female)



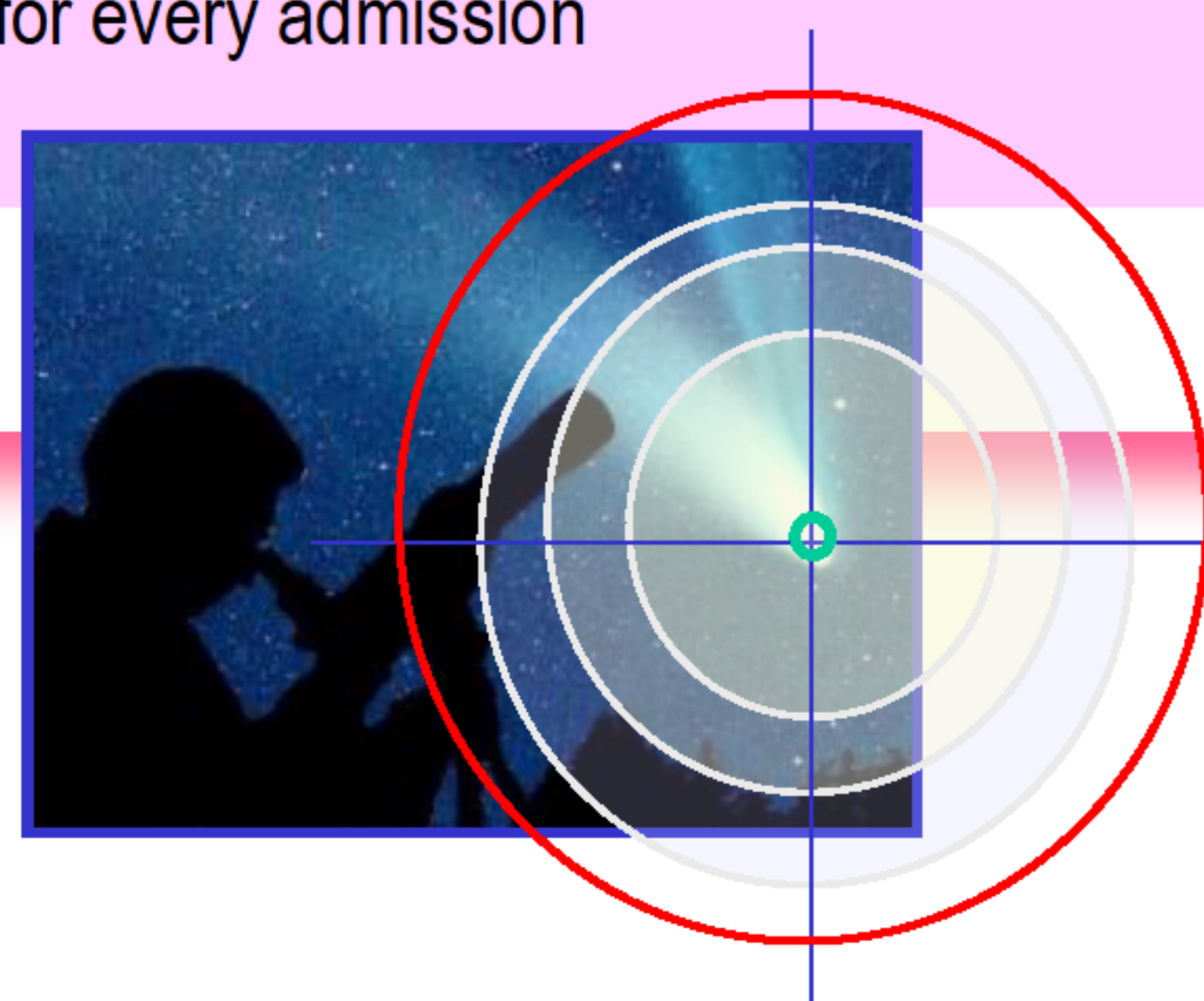
HbA1c risk categories were not related to mortality either with original HbA1c or HbA1c adjusted for Alb and Hb in a Chi Square test. Analysis of gender split reveals an almost significant higher risk of mortality in females which is not present in the adjusted HbA1c model, p=0.055 vs. p=0.64 respectively.

Table 2: Incidence rates per 100 patient years with and without diabetes

Variable	Diabetes	No Diabetes	P-Value	95% CI
Death	14.7	10.3	0.070	0.95 – 2.10
Cardiovascular events	24.7	18.3	0.040	0.99 – 1.82
Hospital days	1397	963	<0.0001	1.40 – 1.51
Hospital Admissions	110	97	0.065	0.99 – 1.30
Length of stay	614	389	<0.0001	1.49 – 1.68

## Summary and Conclusions

- Unlike many other countries who have found diabetes to be a clear mortality risk factor in HD patients, there was no significant association noted in this Swiss cohort
- Glycaemic control does not seem to be related to mortality risk
- The causal factors for the apparent lack of association between glycaemic control and mortality in this cohort warrant further investigation
- There is a trend in females for increased risk of mortality which warrants further investigation
- While mortality risk has not been shown to be significantly different, there is a higher incidence of cardiovascular events, number of days spent in hospital and length of stay for every admission



*monitor!*

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