IMPACT OF PERIODONTAL DISEASE ON SURVIVAL OF HAEMODIALYSIS PATIENTS

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BACKGROUND. OBJECTIVE

- Periodontal disease (PDD) was reported as highly prevalent in haemodialysis (HD) patients and was associated with inflammation-malnutrition complex and higher mortality [1-6].
- The objective was to assess the extention of PDD and its impact on HD patients' survival.

SUBJECTS AND METHODS

- **Study type**: single center observational study
- **Subjects** - 263 stable HD patients, with no malignanacies or acute illness:
  - age: 57 [50-65] years, 60% males, HD vintage 6.9 [6.2-7.6] years, primary kidney disease: glomerulopathies (34%), diabetic nephropathy (11%)
- **Parameters** – collected at baseline:
  - **Periodontal status** (WHO recommendations, by a single examiner), quantified based on loss of clinical attachment level (CAL):
    - **no/mild periodontitis** (CAL<3mm)
    - moderate or severe periodontitis (CAL 3-4 mm or ≥5mm, respectively)
  - **Daemographic datat**
  - **Smoking status**
  - **Haematologic data**
  - **Dialysis adequacy**
  - **Parameters of nutrition-inflammation**
  - **Davies co-morbidity score**
- **Median follow-up period**: 24.6 months

RESULTS

- Examination of oral health showed poor periodontal status in 75% of patients; in 23% PDD was severe.

Determinants of the severity of periodontal disease

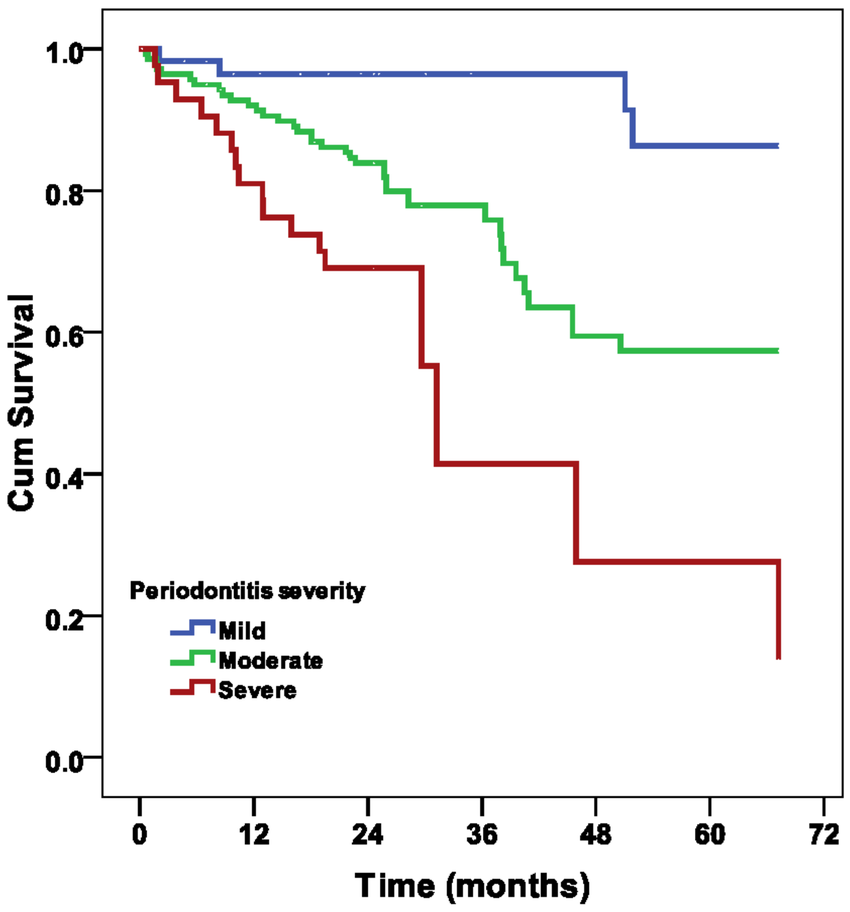
Patients' characteristics according to the severity of periodontal disease

	All	Mild	Moderate	Severe	p
Number (%)	238 (100%)	58 (24%)	138 (58%)	42 (18%)	-
Age (years)	57.0 [50.0 - 65.0]	54.5 [42.9 -60.1]	58.00 [51.00 - 67.08]	58.0 [51.0 - 67.0]	0.006
DM (%)	9.2%	1.7%	10.9%	14.3%	0.06
Davies co-morbidity score	0 [0 – 1]	0 [0 - 1]	0 [0 – 1]	1 [0 – 1]	0.001
Death (%)	56 (24%)	4 (7%)	35 (25%)	17 (41%)	0.004
HD vintage (years)	5.2 [2.7 - 9.9]	4.2 [2.7 - 15.9]	5.4 [2.7 - 28.7]	6.8 [3.3 - 27.4]	0.05
Hemoglobin (g/dL)	11.7 [10.8 - 12.5]	11.8 [11.1 - 12.6]	11.6 [10.7 - 12.5]	11.70 [10.7 - 12.3]	0.2
Darbepoetin (mcg/kg per wk)	0.12 [0.08 - 0.30]	0.12 [0.08 - 0.33]	0.13 [0.08 - 0.27]	0.11 [0.08 - 0.36]	0.9
Erythropoietin resistance index*	0.007 [0.010 -0.024]	0.007 [0.010 - 0.024]	0.007 [0.011 - 0.022]	0.007 [0.009 - 0.029]	0.9
Body mass index (kg/m^2)	24.8 [21.9 - 27.8]	24.2 [21.6 - 27.9]	25.1 [22.7 - 27.8]	25.1 [23.1 - 28.7]	0.62
Serum albumin (g/dL)	4.1 [3.9 - 4.3]	4.1 [3.9 - 4.2]	4.1 [3.9 - 4.3]	4.1 [3.8 - 4.4]	0.69
C reactive protein (mg/L)	5 [1 – 10]	3 [1 - 9]	5 [1 - 11]	9 [3 – 23]	0.01
Total calcium (mg/dL)	8.6 [8.2 - 9.0]	8.7 [8.1 - 9.0]	8.6 [8.2 - 9.0]	8.4 [8.1 - 8.9]	0.44
Serum phosphate (mg/dL)	5.52±1.53	5.22±1.42	5.67±1.52	5.49±1.68	0.18
PTH (pg/mL)	**224.2** [89.9 - 515.7]	**149.7** [77.6 - 56.0]	**343.8** [86.1 - 599.3]	**221.3** [127.4 - 432.2]	0.24
Serum bicarbonate (mEq/L)	**20.8** [19.3 - 22.1]	**20.7** [19.2 - 22.1]	**20.9** [19.3 - 22.1]	**20.3** [19.2 - 22.2]	0.92
Kt/V	**1.43** [1.28 - 1.63]	**1.45** [1.32 - 1.66]	**1.45** [1.28 - 1.59]	**1.38** [1.23 - 1.63]	0.44

Data are prezented as mean and standard deviation or as median [quartile 1 – quartile 3] or percentages
* Erythropoietin resistance index = darbepoetin dose (mcg/kg per week)/hemoglobin (g/dL)

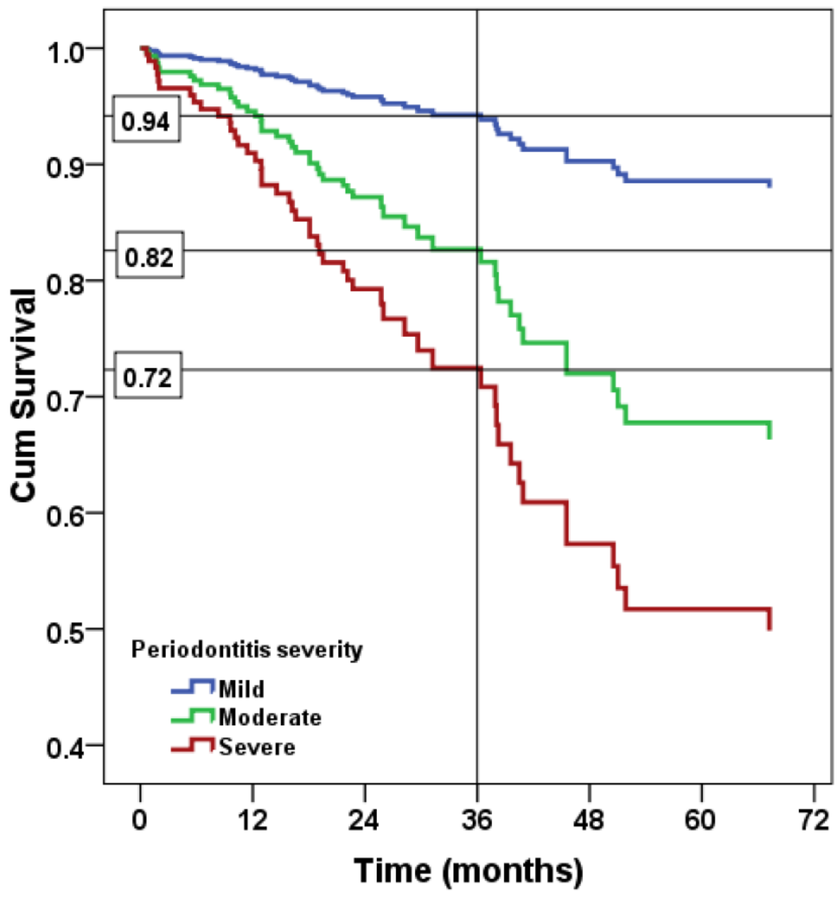
- Patients with severe PDD were older, had a longer HD vintage, higher Davies co-morbidity scores and C-reactive protein (CRP) levels.
- The risk of death was higher in subjects with severe PDD.
- Anaemia, darbepoetin doses and ERI, total calcium, serum phosphate and PTH only marginally differed between groups.
- Dialysis efficiency parameters seemed similar. The nutritionally status was good in the whole cohort.
- Co-morbidities, diabetes mellitus and the related increase in inflammation seem to be related to the severity of PDD, possibly explaining PDD association with the risk of death.

Periodontal disease severity and haemodialisys patients survival



	B	SE	Exp(B) 95%CI	p
ESA dose (Darbepoetinum, mcg/kg per week)	-0.49	0.26	0.60 [0.36-1.01]	0.05
Periodontitis severity (vs Severe)				0.02
Mild	-1.69	0.65	0.18 [0.05-0.66]	0.01
Moderate	-0.52	0.33	0.59 [0.30-1.13]	0.1
Davies comorbidity score	1.15	0.21	3.18 [2.07-4.87]	<0.01

Chi^2:62.5; p<0.001;
Variables entered at step 1: gender, age, BMI, HD vintage, ESA dose, Hb, CRP, serum albumin, serum calcium, serum phosphate, HCO_3, KtV, diabetes status, periodontitis severity;
Variables were log transformed to satisfy assumptions of normality.



- In unadjusted Kaplan Meier analysis, patients with severe PDD had the lowest chances of survival (median of 31.2 mo) as compared to those with moderate (50.5 months) or with those with mild disease (63.4 mo).
- In the multivariate CPH model, higher comorbidity score (HR 3.18 [2.07-4.87]), higher ESA doses (HR 0.60 [0.36-1.01]) and more severe periodontal impairment were independent predictors of death.
- Patients with normal/mild periodontal disease had a survival advantage when ajusted for independent predictors.

CONCLUSIONS

- Impaired periodontal health was highly prevalent in our cohort of HD patients and its severity was related to age, dialysis vintage, diabetic status, co-morbidities and inflammation, and was directly associated with reduced chances of survival.
- The relationship between PDD and the other co-morbidities in HD patients remains unclear: periodontitis could be either another consequence of poor health status, or add severity to the other co-morbidities.
- An interventional trial to evaluate the influence of periodontal disease on hard end-points is required for differentiation.

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