Metabolic consequences of antipsychotic medication in youths with type 1 diabetes: analysis from the prospective nationwide German and Austrian diabetes survey DPV

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Background:

The use of antipsychotic medication in medical practice is increasing in Europe. Antipsychotics have serious adverse effects like weight gain.

Objective:

Aim was to explore metabolic risk factors and glycaemic control in youths with type 1 diabetes treated with typical or atypical antipsychotics.

Design and methods:

Data of children, adolescents and young adults with type 1 diabetes up to the age of 25 years and with diabetes duration of more than six months registered in the prospective, nationwide German and Austrian computer-based diabetes survey (DPV) were included in the analysis.

BMI SDS, HbA1c, prevalences of dyslipidaemia, microalbuminuria, and retinopathy, and frequencies of hypoglycaemia and diabetic ketoacidosis (DKA) in subjects treated with typical or atypical antipsychotics were compared to those without antipsychotic medication (atypical or typical, see affix below) and analysed by regression analysis.

Results:

A total of 291 patients with type 1 diabetes (age 17 years, 60% males, diabetes duration 7.2 years) received antipsychotic medication (most commonly risperidone).

Characteristics of patients

all subjects with type 1 diabetes aged < 25 years	without antipsychotic medication	with antipsychotic medication	p
number	59,871	291	-
age (years)	**15.5 (11.8; 17.6)**	**17.0 (14.2; 18.3)**	**<0.001**
gender ratio (male/female)	**52% / 48%**	**60% / 40%**	**0.006**
diabetes duration (years)	**5.1 (2.1; 8.7)**	**7.2 (3.5; 10.9)**	**<0.001**
BMI SDS	**+0.53 (+0.52; +0.54)**	**+0.71 (+0.58; +0.84)**	**0.003**
HbA1c (%)	**7.9 (7.1; 9.2)**	**8.2 (7.3; 9.6)**	**0.008**
insulin pump treatment	27%	23%	0.21
hypertension	13%	14%	0.46
dyslipidaemia	**30%**	**37%**	**0.008**
microalbuminuria	**33%**	**37%**	**0.009**
retinopathy	3.5%	4.4%	0.47
rate of severe hypoglycaemias (per 1 patient-year)	**0.17 (0.002)**	**0.23 (0.04)**	**0.008**
rate of DKA (per 1 patient-year)	**0.06 (0.001)**	**0.16 (0.03)**	**<0.001**

Data expressed as median (lower quartile; upper quartile) or mean (lower 95% CL for mean; upper 95% CL for mean) and as per 1 patient-year (confidence interval range).
Statistics: Kruskal-Wallis test, Chi-square test, Poisson model

Subjects treated with antipsychotics had a significant higher BMI SDS (p=0.003) and dyslipidaemia was more frequent (p=0.008) compared to subjects without antipsychotic medication. Frequencies of severe hypoglycaemias and DKA were significantly higher in patients receiving antipsychotics (p=0.008 and p<0.001).

Regression analysis adjusting for age, gender, and diabetes duration

variable	without antipsychotic medication	with antipsychotic medication	p
HbA1c (%)	8.4	8.4	0.45
BMI SDS	**+0.50**	**+0.67**	**0.004**
insulin pump treatment	29.1%	24.5%	0.11
dyslipideamia	**28.3%**	**33.6%**	**0.045**
hypertension	11.0%	11.0%	0.99
microalbuminuria	23.2%	23.8%	0.79
retinopathy	0.8%	0.9%	0.76
rate of severe hypoglycaemias (per 1 patient-year)	**0.19**	**0.27**	**<0.001**
rate of DKA (per 1 patient-year)	**0.05**	**0.12**	**<0.001**

variable	medication with typical antipsychotics	p	medication with atypical antipsychotics	p
	vs without antipsychotic medication			
HbA1c (%)	8.2 vs 8.4	0.15	**8.7 vs 8.4**	**0.022**
BMI SDS	**+0.69 vs +0.50**	**0.028**	**+0.72 vs +0.50**	**0.004**
insulin pump treatment	29.7 vs 29.1%	0.90	**21.0 vs 29.1%**	**0.037**
dyslipideamia	33.6 vs 28.3%	0.16	34.0 vs 28.3%	0.10
hypertension	12.0 vs 11.0%	0.69	9.2 vs 11.0%	0.42
microalbuminuria	22.4 vs 23.2%	0.81	25.4 vs 23.2%	0.49
retinopathy	0.9 vs 0.9%	0.94	0.9 vs 0.9%	0.99
rate of severe hypoglycaemias (per 1 patient-year)	**0.34 vs 0.19**	**<0.001**	0.22 vs 0.19	0.29
rate of DKA (per 1 patient-year)	**0.13 vs 0.05**	**<0.001**	**0.12 vs 0.05**	**<0.001**

Conclusions:

This analysis demonstrated that treatment with antipsychotic medication was associated with higher BMI SDS and higher rates of acute diabetic complications in youths with type 1 diabetes.

Affix - Classification of atypical and typical antipsychotic agents:

Atypical: clozapine, olanzapine, quetiapine, risperidone, sulpiride, amisulpride, aripiprazole, paliperidone, ziprasidone, zotepine, sertindole, clotiapine, asenapine, iloperidone, lurasidone

Typical: haloperidol, droperidol, benperidol, trifluperidol, melperone, lenperone, pipamperone, bromperidol, fluspirilene, pimozide, penfluridol, clopimozide, chlorpromazine, fluphenazine, perphenazine, prochlorperazine, thioridazine, trifluoperazine, perciazine, promazine, triflupromazine, levomepromazine, promethazine, cyamemazine, perazine, thiethylperazine, thiopropazate, thioproperazine, acetophenazine, butaperazine, carfenazine, dixyrazine, homophenazine, oxaflumazine, prothipendyl, chlorprothixene, clopenthixol, flupentixol, thiothixene, zuclopenthixol, benzamid, loxapine