First stages of diabetes type 2 effects in the bladder; to which extent antioxidant treatment can be beneficial for the bladder tissue? 
Division of Urology, Tottori University Faculty of Medicine, Yonago, Japan

Introduction

- Type 2 diabetes accounts for almost 90% of all cases of diabetes in adults worldwide.
- Countries become richer, people eat a more sugar and fat-rich diet and begin to lose physical activity.
- The incidence of diabetes increases.

Diabetes-associated bladder dysfunction

<table>
<thead>
<tr>
<th>Symptoms of diabetes</th>
<th>Cause of diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increased bladder sensitivity</td>
<td>1. Decreased bladder sensation</td>
</tr>
<tr>
<td>2. Frequency and urgency</td>
<td>2. Decreased bladder sensation</td>
</tr>
<tr>
<td>3. Increased voiding effort</td>
<td>3. Decreased bladder sensation</td>
</tr>
</tbody>
</table>

Oxidative stress in diabetes

In the current study we aimed to create a short-period diabetes type-2 model in order to investigate oxidative stress-related alterations in the bladder in the initiation of the disease. Additionally, antioxidant treatment with resveratrol or taurine was provided in order to examine whether it is possible to prevent these alterations in the very beginning of the disease.

Methods

Male Wistar rats (8-week-old) (n=40)

Day 1

Control group (n=10)

Single dose of STZ (40mg/kg) i.p. (n=30)

Day 2

Confirmation of DM by measuring urinary glucose

Day 3

Treatment period lasted 14 days

Divide DM animals into 3 groups and feed them with high fat diet

Control DM Resv Tau

Non-treated DM Group (n=10)

DM + resveratrol Group (10mg/kg/day) (n=10)

DM + taurine Group (100mg/kg/day) (n=10)

At the end of the 14 days experimental period of all animals were sacrificed. Bladders were processed for:

1. Histological evaluation,
2. Measurements of malondialdehyde (MDA) and
3. Immunohistochemistry (IHC) for oxidative stress markers.

Results

1. General Features of the animals and MDA levels in the bladder

Body Weight

Bladder Weight

Bladder weight/body weight

MDA levels in the bladder

Blood Glucose

- Histology of the bladder of all groups (magnification x200; bar: 50μm)/ Hematoxylin-Eosin staining
- MDA expression and localization in the bladder (magnification x200; bar: 50μm)/ Lipid peroxidation marker
- 4-HNE expression and localization in the bladder (magnification x200; bar: 50μm)/ Lipid peroxidation marker
- 8-OHdG in the bladder (magnification x200; bar: 50μm)/ DNA oxidative stress marker

Conclusions

During first stages of diabetes

- Increase of oxidative stress in the bladder

Induction of structural damage in the bladder

Overexpression of oxidative stress markers in the bladder

Prompt diagnosis of diabetes and treatment

Oxidative stress status accompanying diabetic bladder cystopathy results in the activation of protein degradation pathways.

REFERENCES