Relationship between urinary Equol level and the prevalence of pelvic organ prolapse

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Background

Equol

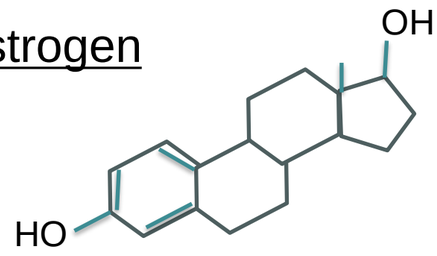
- It is a substance produced when Isoflavone is metabolized by gut microbiota.
- Approximately 50% of the Japanese population is capable of producing Equol[1].
- It has an estrogen-like structure and binds to estrogen receptors and has estrogenic effects.

Pelvic Organ Prolapse (POP)

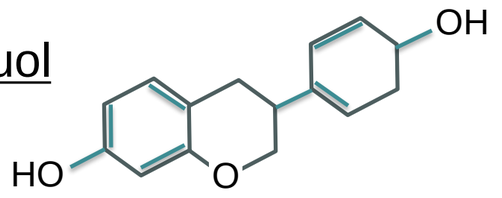
- One of the causes of POP is decreased estrogen secretion after menopause.
- Estrogen replacement therapy is effective in treatment and prevention for POP.

However, there are no reports on the association between Equol and POP.
In this study, we investigated the association between the presence or absence of Equol production and the occurrence of POP and its associated symptoms related to lower urinary tract symptoms in patients with POP.

Estrogen



Equol



1. Yoshikata R, et al. PLoS One. 2024; 19: e0288946

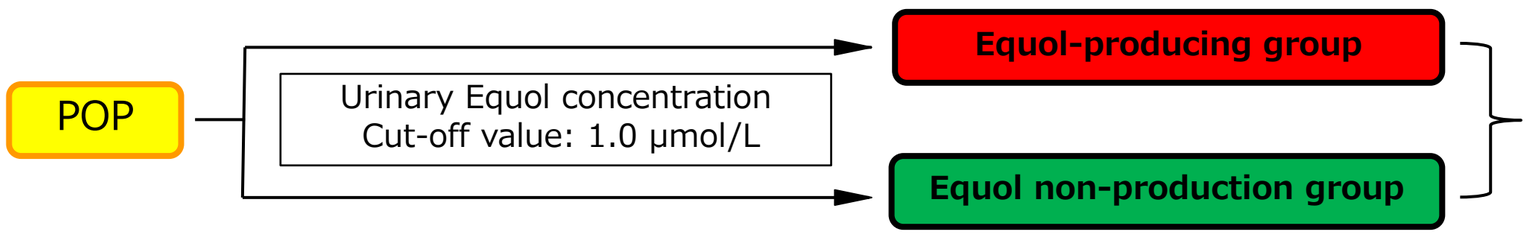
Patients and Methods

Patients

- diagnosed with POP at our institution between April 2019 and December 2023

Methods

- a retrospective study
- used spot urine to measure Equol concentration using Equol ELISA Kit (Cosmo Bio Co., Ltd, Tokyo, Japan)
- evaluated the patients' background, subjective symptoms, and objective findings



Overactive bladder (OAB) was defined by OAB Symptom Score (OABSS).
- ✓ Q3 (urgency score) of at least 2 points
and
- ✓ Total score of at least 3 points

Subjective symptoms	✓ OABSS
Objective findings	✓ UFM ✓ Post-voided residual urine volume ✓ POP-Q

UFM: uroflowmetry, POP-Q: Pelvic Organ Prolapse-Quantification

Results

Variables	Equol-producing group	Equol non-production group	P value
Number of patients (%)	32 (57.1)	24 (42.9)	0.350
Age at onset, y.o	70.6 ± 6.8	66.1 ± 5.0	0.008
Urinary Equol concentration, μmol/L	4.80 ± 7.18	0.28 ± 0.32	< 0.001
Body mass index, kg/m^2	23.2 ± 3.5	25.1 ±3.1	0.037
Parity	2.5 ± 0.8	2.2 ± 0.7	0.226
Gynecological surgery（%）	7 (21.9)	5 (20.8)	1.000
Hypertension（%）	22 (68.8)	16 (66.7)	1.000
Diabetes mellitus（%）	10 (31.3)	11 (45.8)	0.282
Dyslipidemia（%）	15 (46.9)	15 (62.5)	0.288
Subjective symptoms (OABSS)			
Q1. Daytime frequency	1.20 ± 0.56	0.87 ± 0.52	0.105
Q2. Nocturia	2.27 ± 0.80	1.27 ± 1.03	0.010
Q3. Urgency	2.73 ± 1.83	2.73 ± 1.75	1.000
Q4. Urgency incontinence	2.00 ± 1.93	1.93 ± 2.05	1.000
Total OABSS	8.20 ± 4.09	6.80 ± 4.80	0.404
Overactive bladder（%）	25 (78.1)	16 (66.7)	0.685
Objective findings			
Voided volume, mL	241.9 ± 32.8	279.4 ± 147.3	0.423
Maximum flow rate, mL/sec	21.0 ± 11.1	22.2 ± 14.9	0.883
Post-void residual volume, mL	52.1 ± 94.2	95.1 ± 118.8	0.201
POP-Q, Stage	2.8 ± 0.6	2.8 ± 0.6	0.965

Analysis of age at onset in patients with POP

	univariate analysis		multivariate analysis	
	HR (95% CI)	P value	HR (95% CI)	P value
Equol-producing (presence)	0.434 (0.244 – 0.773)	0.005	0.433 (0.233 – 0.802)	0.008
Body mass index	1.047 (0.967 – 1.134)	0.259	1.018 (0.933 – 1.112)	0.689
Parity	1.099 (0.786 – 1.536)	0.581	1.178 (0.822 – 1.688)	0.374
Gynecological surgery (presence)	1.122 (0.590 – 2.137)	0.725	1.156 (0.602 – 2.220)	0.664
Hypertension (presence)	0.815 (0.463 – 1.436)	0.479		
Diabetes mellitus (presence)	1.349 (0.756 – 2.394)	0.307		
Dyslipidemia (presence)	0.986 (0.578 – 1.683)	0.958		

Discussion and Conclusion

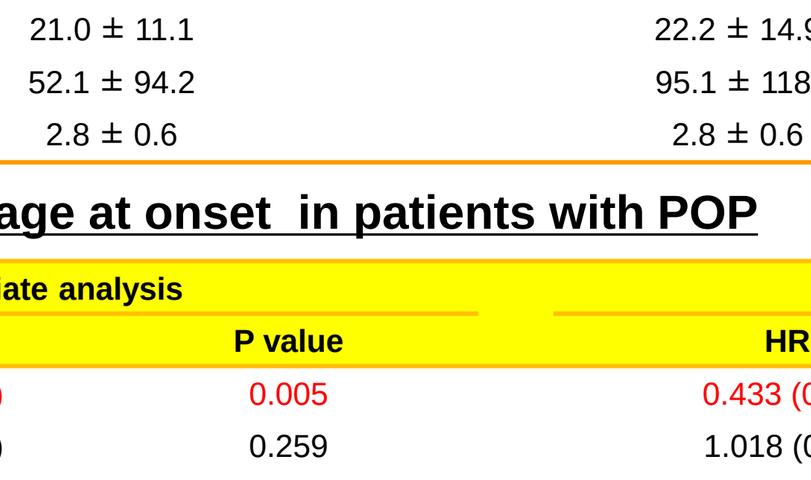
Equol

- Estrogenic effects
- Collagen synthesis[2]
- Vasodilatory effects[3]
- Antioxidant action[4]
- Anti-inflammatory effects[5]
- Improve lipid metabolism[6]
- Improve glucose metabolism[7]

Causes of POP

e.g.
Hypertension
Diabetes mellitus
Dyslipidemia

e.g.
Oxidative stress



Efficacy of Equol

Equol may have **delayed** **the onset of POP.**

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COI : The authors declare no conflict of interest associated with this research.