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Pekka Collin, MD, Ph.D

Medical School, FIN 33014 University of Tampere, Tampere, Finland

Email pekka.collin@uta.fi

Talking points (slide 1)

1. Rationale behind and explanation of a retrospective analysis of gluten levels in a gluten-free diet to establish a threshold level
2. Specifics/details on the development/use of the gluten exposure table featured in 2004 article on thresholds
3. Variability of sensitivity to gluten among celiacs, including relative sensitivity to different grains of concern and related food ingredients (e.g., oats & wheat starch) – Northern European View

1. The compliance to gluten-free diet is good in Finland, also in patients with clinically silent disease. Most of the patients use wheat starch based gluten-free products (slide 2).

Intolerance to cereals is not a specific sign of celiac disease (slide 3), and studies based on symptoms may be unreliable. We have 10-year biopsy proven data on mucosal recovery and quality of life in patients with celiac disease.

The mucosal recovery has been complete in patients who adhere to strict gluten-free diet (slide 4).

Quality of life is good (1), malignant complications rare, and mortality rate not different from that in the population in general (2).

This prompted us to investigate, what is the threshold for residual gluten in wheat-starch based gluten-free products, which have been used successfully in Finland more than 40 years?

2. Trace amounts of gluten were found in both naturally gluten-free and wheat-starch derived products (slide 5).

The median daily use of flours was 80 g (range 10-300), and mostly less than 100 g (slide 6).

Provided that the threshold of gluten content is set at 100 ppm, and the daily flour intake is 200 g, the daily gluten amount does not exceed 20 mg (slide 7).

3. The sensitivity to gluten is different in patients with celiac disease: a complete small-bowel recovery is not achieved in all, and the time for recovery is variable (3) (slide 8). The same phenomenon can be seen in gluten challenge studies (4-5). Advertent or inadvertent gluten intake is probably essential in this context.

The mucosal recovery was similar in patients maintaining wheat-starch based or naturally gluten free diet (slides 9 and 10).

The use of oats diversifies the diet (slide 11). In Finland, the majority of celiac disease patients are using oats (slide 12). However, some individuals developed symptoms, and stopped using oats (10% of patients with celiac disease and 19% with dermatitis herpetiformis). Diarrhea was more common in individuals taking oats than in those on traditional gluten-free diet (slide 13). The correlation between

symptoms and mucosal damage is not evident, however (6).

Conclusions

Trace amounts of residual gluten are not harmful; a good dietary compliance is more important. (slide 14). Not all patients with celiac disease tolerate oats, but the intolerance is usually not associated with mucosal deterioration (slide 15).

The slides are based on the following studies:

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- Collin P, Maki M, Kaukinen K. Complete small intestine mucosal recovery is obtainable in the treatment of celiac disease. *Gastrointest Endosc* 2004;59(1):158-9.
- Kaukinen K, Collin P, Holm K, Rantala I, Vuolteenaho N, Reunala T, et al. Wheat starch-containing gluten-free flour products in the treatment of coeliac disease and dermatitis herpetiformis. A long-term follow-up study. *Scand J Gastroenterol* 1999;34:164-169.
- Peräaho M, Kaukinen K, Paasikivi K, Sievänen H, Lohiniemi S, Mäki M, et al. Wheat-starch-based gluten-free products in the treatment of newly detected coeliac disease. Prospective and randomized study. *Aliment Pharmacol Therapy* 2003;17:587-94.
- Peräaho M, K. K, Mustalahti K, Vuolteenaho N, Mäki M, Laippala P, et al. Effect of an oats-containing gluten-free diet on symptoms and quality of life in coeliac disease. A randomized study. *Scand J Gastroenterol* 2004;39:27-31.
- Peräaho M, Collin P, Kaukinen K, Kekkonen L, Miettinen S, Mäki M. Oats can diversify a gluten-free diet in celiac disease and dermatitis herpetiformis. *J Am Diet Assoc* 2004;104:1148-50.

Additional references

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2. Collin P, Reunala T, Pukkala E, Laippala P, Keyriläinen O, Pasternack A. Coeliac disease - associated disorders and survival. *Gut* 1994;35(9):1215-8.
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4. Mäki M, Lahdeaho ML, Hällström O, Viander M, Visakorpi JK. Postpubertal gluten challenge in coeliac disease. *Arch Dis Child* 1989;64(11):1604-7.
5. Mayer M, Greco L, Troncone R, Grimaldi M, Pansa G. Early prediction of relapse during gluten challenge in childhood celiac disease. *J Pediatr Gastroenterol Nutr* 1989;8(4):474-9.
6. Storsrud S, Olsson M, Arvidsson Lenner R, Nilsson L, Nilsson O, Kilander A. Adult coeliac patients do tolerate large amounts of oats. *Eur J of Clin Nutr* 2003;57:163-9.