Publication of the Month

EliA™ Excellence in Autoimmunity

April 04/08: Cost-effectiveness of strategies for diagnosing celiac disease

Diagnostic criteria for celiac disease (CD) as defined by the ESPGHAN are based on two clinical findings: abnormal small intestine mucosa and response to gluten-free diet. However, both CD case finding and screening of risk groups in general practice rely on serological methods as a first step, as endoscopy/biopsy are very expensive and can also not be justified ethically in asymptomatic or other subjects without a very high suspicion of CD. Depending on both country and labs there are different serological strategies in use, such as EMA, anti-tTG and anti-gliadin or combinations of them. The authors of the paper presented estimate the costs of different strategies and relate them to their usefulness. This approach may be of great help in the labs' decisions, particularly in times of cost savings in the health care system.

Dorn SD and Matchar DB
Cost-effectiveness analysis of strategies for diagnosing celiac disease
Dig Dis Sci (2008) 53:680 - 688

The authors calculate costs and performance of 5 different strategies:

1. tTG alone
2. tTG → endoscopy/biopsy for tTG positives
3. tTG → total IgA for tTG negatives → endoscopy/biopsy for tTG positives and IgA deficients
4. tTG → HLA for tTG positives → endoscopy/biopsy for HLA positives
5. Endoscopy/biopsy alone

Prerequisites for the calculation are the current costs in the USA based on the average reimbursement 2006. Base case estimates of assay performance and prevalence of CD, HLA and IgA deficiency are based on the literature.

When assuming a prevalence of CD in the population tested in a normal routine lab of 3 % the least costly option was strategy 1 (tTG alone) which generated costs of only 22 $/patient, followed by strategies 2 and 4, which were almost 3 times more costly than strategy 1. Strategies 3 and 5 generate much higher costs of 83 $ and 915 $, respectively. However, the performance of the different strategies differs a lot, strongly depending on the prevalence of CD in the population tested, and has to be weighed against the costs. The cheapest strategy (tTG alone; 22 $/patient) shows a lack of positive predictive value (PPV) in a screening situation, where the prevalence of CD is 3 %. The best option in terms of cost/performance ratio for this scenario are strategies 2 (tTG → endoscopy/biopsy for tTG positive; 63 $/patient) or 4 (tTG → HLA for tTG positives → endoscopy/biopsy for HLA positives; 59 $/patient), which are already applied by many clinicians. However, as the prevalence of CD in the population tested increases, e.g. in a specialist's lab, the PPV of tTG alone increases substantially and differences to the other scenarios become smaller. Furthermore the additional cost required to avert a false-positive diagnosis rises substantially in this setting and must be weighed against the consequences of a false positive diagnosis.
This paper shows that tTG is a very valuable screening test for celiac disease, but only if its specificity is very high. Less specific tests lead to a dramatic increase in follow-up costs. This is due to the much higher number of false positive results generated by these tests in a population where the prevalence of CD is low. The publication focuses on tTG as only serological tests, however, it can be assumed that the PPV of serology in strategy 1 could be increased by using a highly specific anti-gliadin IgA test in parallel, which would double the costs, but would still be cheaper than the other strategies.