

Diagnosing Red Meat Allergy; What to learn from serology measurement!

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Introduction

Patients with Red Meat Allergy are sensitized to the carbohydrate Galactose-alpha-1,3-galactose (Gal-Alpha-Gal) and have delayed type 1 allergic reaction after ingestion of mammalian meat or innards. Diagnosing these patients is difficult due to delayed reaction and is often based on case history and serology. We aimed to characterize serology pattern to different sources of allergens in patients suspected with red meat allergy.

Method

All patients referred to the Allergy Center at Odense University Hospital from 2001 – 2017 suspected of Red Meat allergy (n=123). Based on thorough case history and serology, 45 patients had their diagnose confirmed, whereas 78 were declined.

Patients were evaluated based on IgE to Gal-alpha-Gal, Beef and Pork, Skin prick test (SPT) with beef (cooked and raw), pork (cooked and raw), pork kidney (cooked and raw), lamb (cooked and raw), deer (cooked and raw), and Gelofusine (colloid plasma expander, B. Braun Medical). Diagnostic values were calculated using ROC curve.

Twelve patients with confirmed Red Meat allergy had additionally Histamine Release from basophil leucocytes (HR) measurements with same allergens as skin prick test as well as Bovine Thyroglobulin (Sigma Aldrich) and Porcine gelatin.

Results

IgE against Gal alpha Gal > 2,70 kU/l showed best diagnostic capacity (sens/spec 0,91/0,96) followed by SPT with raw pork kidney (0,89/0,89) and IgE to raw pork and raw beef. The remaining SPT behaved poorly. 2 patients with red meat allergy had IgE < 0,35 kU/l. Heat treatment reduced sensitivity compared to raw material of all SPT. This was confirmed by HR where cooked beef, pork and pork kidney required higher concentration to release similar histamine amount compared to raw material. Bovine Thyroglobulin, Porcine gelatin and pork kidney resulted the highest HR. Lamb, deer and gelofusine did not provide any additional value.

Conclusion:

IgE to Gal-alpha-gal and in-vivo test with pork kidney are the most important test, whereas bovine thyroglobulin (the source of Gal-alpha-gal in IgE test) shows potential in histamine release. Heat treatment and meat from other mammalian than pig and cow seem irrelevant.