Protein intake and non-alcoholic fatty liver disease: a cross-sectional analysis on the National Health and Nutrition Examination Survey

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References:

Background
Non-alcoholic fatty liver disease (NAFLD): presence of >5% hepatic fat without excessive alcohol consumption / viral hepatitis [1]
Global prevalence: 32.4% [2]
Firstline treatment is by lifestyle modification, of which diet plays an important role
Inconsistent findings on protein intake (amount & sources) and risk of NAFLD

Aim
To study the association between intake of different sources of protein on the risk of NAFLD.

Methods
Exposure: daily intake (in quantiles of gram) of total, plant, animal, dairy, muscle and egg protein, assessed by two 24hr recalls. Protein types were defined based on USDA Food Coding Scheme [4].
Outcome: NAFLD, defined as US fatty liver index (USFLI) ≥ 30 [5]
• Traditional diagnostic procedures (biopsy, ultrasound, magnetic resonance imaging) are difficult to perform in large-scale studies.
• USFLI is a validated formula involving age, race, waist circumference and 3 blood parameters (fasting glucose, fasting insulin and gamma-glutamyl transferase).

Multivariable logistic regression, adjusted for:
• Sex, age, race, education, income
• Smoking status, physical activity
• Intake of total carbohydrates, fat, alcohol, fibre (in gram)
• Protein types were further adjusted for each other.
• All analyses accounted for the complex survey design of NHANES.

Results
Sample size
Total NHANES participants (66148)
Excluded
• No fasting blood (47175)
• <20y (3215)
• Pregnant women (147)
• Unreliable dietary data (2677)
• Excessive alcohol usage (1248)
• Hepatitis B/C (336)
• Ever had cancer (1177)
• Missing data (1827)
Included (8346)

Subject characteristics
% Total energy intake
- Fat 35%
- Carbohydrate 49%
- Protein 16%
- Animal protein 10%
- Muscle 7%
- Dairy 6%
- Plant 6%
- Eggs 1%

Odds ratio (95% confidence interval)

Protein types

Comparison
Q2 vs Q1 Q3 vs Q1 Q4 vs Q1
Total 0.94 (0.78-1.14) 1.10 (0.92-1.33) 1.15 (0.91-1.45)
Plant 1.01 (0.82-1.24) 1.05 (0.87-1.28) 1.25 (0.96-1.63)
Animal 1.13 (0.94-1.35) 1.02 (0.85-1.22) 1.19 (0.99-1.44)
Dairy 0.81 (0.67-0.98) 0.72 (0.59-0.87) 0.68 (0.54-0.86)
Muscle 1.06 (0.90-1.25) 1.11 (0.91-1.34) 1.19 (0.96-1.49)
Eggs / / 1.00 (0.86-1.17)

Conclusion
Our analysis of this large population-based sample indicated that the risk of NAFLD may be associated with a dietary pattern poor in dairy protein, independent of other risk factors.

References: