COMMITTEE ON CARCINOGENICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT

Consideration of recent meta-analysis investigating the effect of alcohol on renal cell carcinoma risk

1. In light of Members' suggestion to consider the recently published meta-analysis on alcohol consumption and non-Hodgkin lymphoma (NHL) and Hodgkins lymphoma (HL), the Secretariat also felt Members should consider two recent meta-analysis on alcohol consumption and renal cell carcinoma by Song et al. (2012) (Annex A) and Bellocco et al. (2012) (Annex B).

2. IARC Monograph 96 (IARC, 2010) concluded that both cohort and case–control studies provide consistent evidence of no increase in risk for cancer of the kidney with consumption of alcoholic beverages. In several studies, increasing intake of alcoholic beverages was associated with a significantly lower risk for cancer of the kidney. The inverse trends were observed in both men and women and with multiple types of alcoholic beverage. The most recent IARC evaluation (2012) considered additional studies published since the last evaluation (one cohort and three case–control studies) and overall they concluded that there is no causal association between consumption of alcoholic beverages and cancer of the kidney.

Renal Cell Carcinoma Cancer Statistics for the UK

3. Renal cell carcinoma was the 8th most common cancer in the UK in 2011, accounting for 3% of all new cases. Renal cell carcinoma was the 7th and 10th most common cancer among men and women, respectively, in the UK in 2010 accounting for 4% of all new cases of cancer. In 2011, there were 10,144 new cases of renal cell carcinoma in the UK (6,257 men and 3,887 women) giving a male:female ratio of 16:10. Kidney cancer is the 12th most common cause of cancer death in the UK (2011), accounting for 3% of all deaths from cancer. In 2011, there were 4,189 deaths (2,572 men and 1,617 women) from renal cell carcinoma in the UK giving a male:female ratio of around 16:10. In 2011, the crude mortality rate showed that there were 8 deaths for every 100,000 males in the UK and 5 for every 100,000 females. Major risk factors for kidney cancer are age, sex, obesity, smoking, and some genetic and medical conditions. A report by the World Cancer Research Fund in 2007 stated that the evidence indicates that alcohol does not have a substantial adverse effect on kidney cancer risk.

Meta-Analysis on Alcohol Drinking and the risk of renal cell carcinoma

4. Two recently published meta-analyses are considered here.

5. Song et al. (2012) carried out a meta-analysis on a total of 20 case–control studies, 3 cohort studies, and 1 pooled analysis of cohort studies to investigate the role of alcoholic beverage intake including the role of specific alcoholic beverage types in renal cell cancer risk. A total of 13,819 renal cell cancer cases and 1,537

kidney cancer cases were included in this meta-analysis. Studies published up to August 2011 were identified for inclusion in the analysis. For the exposure assessment and in order to have a uniform variable of alcohol consumption of specific beverages for the meta-analysis, the authors used the amount of alcohol consumed in terms of grams of ethanol per day using the following conversion factors: 1 drink = 15 g, 11.3 g of ethanol for a 4-oz (118 ml) glass of wine, 12.8 g for 12-oz (354 ml) one glass, bottle, or can for beer, and 14.0 g for one measure (45 ml) for liquor. Overall relative risks (RRs) and 95% confidence intervals (CIs) were estimated using a random effects model and combined RRs and 95% CIs were computed from the estimates reported in each study. Results were adjusted for study design, sex, smoking and hypertension. In their analysis comparing the top intake category with the bottom intake category, they found a decreased risk of renal cell cancer with alcohol consumption (RR for all studies combined = 0.73 (95% CI = 0.67 - 0.79). A stronger inverse association was observed in cohort studies compared with case–control studies (combined RR of 0.71 (95% CI = 0.63 - 0.78) and 0.79 (95% CI = 0.68 - 0.85) for cohort and case-control studies, respectively). They also observed an inverse association for each of the specific type alcoholic beverage (beer, wine, and liquor) and renal cancer risk in both case-control and cohort studies. The inverse association did not differ by gender, smoking or hypertension adjustments. Their spline analysis for non-linearity of the association showed that ~ 15 g per day of ethanol intake could pose a decrease in renal cell cancer risk, but additional drinking did not confer further benefit.

6. Bellocco et al. (2012) carried out a meta-analysis on a total of 4 cohort studies, 1 pooled analysis and 15 case–control studies to investigate the role of alcoholic beverage intake in renal cell cancer risk. Studies published up to November 2010 were identified for inclusion in the analysis. For the exposure assessment and in order to have a uniform variable of alcohol consumption of specific beverages for the meta-analysis the authors used a standardized scale of grams per day: 28 g for 1 oz, 0.8 g for 1 ml of alcohol and 12.5 g for one drink. Overall relative risks (RRs) and 95% confidence intervals (CIs) were estimated using a random effects model. Study-specific risk estimates were also calculated for three levels of alcohol consumption (ever (≥0.01 g/day), light (0.01–12.49 g/day), moderate (12.5–49.9 g/day) and heavy drinking (≥50 g/day). A dose–risk analysis was carried out using a random-effect meta-regression model based on a nonlinear dose–response relationship framework. They found a statistically significant decreased risk of renal cell cancer with alcohol consumption (RR for all studies combined = 0.85, 95% CI: 0.80–0.92) with RR estimates from case–control studies (RR = 0.88, 95% CI 0.80–0.96) and cohort studies (RR = 0.80, 95% CI: 0.69–0.92). Using a forest plot to compare light intake of alcohol consumption with non-drinking they estimated the RRs as 0.92 (95% CI 0.82–1.03) from the ten case–control studies, 0.89 (95% CI 0.82–0.97) from the four cohort studies and 0.90 (95% CI 0.84–0.97) from all studies combined. Similarly, the forest plot for moderate alcohol consumption compared with non-drinking estimated the RR from the nine case–control studies as 0.81 (95% CI 0.71–0.93), from the five cohort studies was 0.74 (95% CI 0.61–0.88) and the overall estimate was 0.79 (95% CI 0.71–0.88). Comparing heavy drinking versus non-drinking, there was a borderline negative association between cancer risk and consumption of ≥50 g/day of alcohol (RR = 0.81, 95% CI 0.67–0.98). However, inclusion of two cohort studies, increased the RR to 0.89 (95% CI 0.58–1.39). Overall results from the meta-analysis

indicated that light to moderate alcohol drinking was associated with a 10%– 20% reduced risk of renal cell carcinoma.

Summary

7. Both meta-analysis indicated an inverse association between alcohol consumption and renal cell carcinoma. The negative association was also confirmed in the dose–risk analysis by Bellocco et al. (2012) but the risk reductions levelled off for daily intake > 20/25 g. Similarly, Song et al. (2012) reported that ethanol consumption of ~ 15 g per day resulted in a decrease in renal cell cancer risk, but heavier consumption conferred no additional benefits.

Questions for the committee

1) What are the views of the Committee on the recently published meta-analysis on alcohol consumption and renal cell carcinoma risk?
2) Do these meta-analyses add further weight to the statement by IARC (2012) on alcohol consumption and this cancer type?
3) Do members think there is sufficient data to come to a conclusion about the amount of alcohol and nature of drinking i.e. cumulative per week, daily intake, type of alcohol and renal cell carcinoma risk?

References

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R. Bellocco, E. Pasquali, M. Rota, V. Bagnardi, I. Tramacere, L. Scotti, C. Pelucchi, P. Boffetta, G. Corrao and C. La Vecchia. Alcohol drinking and risk of renal cell carcinoma: results of a meta analysis. *Annals of Oncology* 23: 2235-2244 (2012).

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D.Y. Song, S. Song, Y. Song and J.E. Lee. Alcohol intake and renal cell cancer risk: a meta-analysis. *British Journal of Cancer* 106, 1881-1890 (2012).

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