Radiation risk to dialysis patients

To the Editor: We read with interest the article of Kinsella *et al.*,[1] who report that diagnostic X-ray could cause as much as a 7% increase of cancer-related mortality in long-term dialysis patients. We have considered some of the same data, and we reach a more benign conclusion.

We agree that occupational radiation exposure of 75 mSv might increase cancer-related mortality by 7%.[2] But the subjects of that report were only 31 years old at first exposure, and all were employed. The average age of subjects starting dialysis in the United States and Europe is over 60 years,[3] and they have co-morbidities that will be lethal before they might die of radiation injury. The latency of radiation-related solid cancers is more than 10 years and the risk decreases with age at exposure.[4] As Kinsella *et al.* point out in their Table 1, their dialysis patients who received the higher radiation doses were on average 61 years old, and had an yearly death rate of 26%. These patients will not survive long enough to develop radiation-related cancers.

It is possible that in children on dialysis who undergo excessive X-ray studies, one might see radiation-induced leukemia, because that cancer has a shorter latency.[5] But this has not been reported.

The immediate benefits of diagnostic X-ray far outweigh the theoretical long-term risk claimed by Kinsella *et al.*

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2. Vrijheid M, Cardis E, Biettner M *et al.* The 15 country collaborative study of cancer risk among radiation workers in the nuclear industry: design, epidemiological methods, and descriptive results. *Radiat Res* 2007; **167**: 361–379.
3. Stel VS, Tomson C, Ansell D *et al.* Level of renal function in patients starting dialysis: an ERA-EDTA registry study. *Nephrol Dial Transplant* 2010; **25**: 3315–3325.
4. Preston DL, Ron E, Tokuoka S *et al.* Solid cancer incidence in atomic bomb survivors: 1958–1998. *Radiat Res* 2007; **168**: 1–64.
5. Richardson D, Sugiyama H, Nishi N *et al.* Ionizing radiation and leukemia mortality among Japanese atomic bomb survivors, 1950–2000. *Radiat Res* 2009; **172**: 368–382.

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Support for a protective effect of bilirubin on diabetic nephropathy in humans

To the Editor: We read with great interest the article by Fujii *et al.*[1] in which they found that bilirubin (BIL) may protect against diabetic nephropathy (DN) in experimental animals, which could pave the way for novel antioxidant therapies for DN. Given these tantalizing results in animal models, it would be of interest to see whether BIL also exerts protection against DN in humans. To this end, we investigated the association between BIL and DN in a case–control study. Cases of DN were defined as duration of type 2 diabetes >5 years, albuminuria >300 mg per day, and presence of diabetic retinopathy ($n=32$). Controls were type 2 diabetic patients without nephropathy, matched for age, sex, and duration of diabetes ($n=32$). Age was 64 ± 9 years, 54% were male, and median (interquartile range, IQR) duration of diabetes was 15 (10–20) years. Urinary albumin concentration was 752 (239–1074) mg/l in cases versus 3 (3-6) mg/l in controls ($P<0.001$). Estimated glomerular filtration rate (GFR) was 65 ± 23 ml/min per 1.73 m^2 in cases versus 84 ± 15 ml/min per 1.73 m^2 in controls ($P<0.001$). BIL was 5.5 ± 2.3 μmol/l in cases versus 7.3 ± 3.3 μmol/l in controls ($P=0.02$).

Our data extend the findings of Fujii *et al.* with support for a protective effect of BIL on DN in humans. Further intervention studies are needed to explore the possibility of using BIL-based novel antioxidant therapies to halt the progression of DN.

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1. Fujii M, Inoguchi T, Sasaki S *et al.* Bilirubin and biliverdin protect rodents against diabetic nephropathy by downregulating NAD(P)H oxidase. *Kidney Int* 2010; **78**: 905–919.

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The Authors Reply: We appreciate Zelle *et al.*,[1] for their interest in our article[2] and for raising some insightful comments in their letter entitled 'Support for a protective effect of bilirubin on diabetic nephropathy in humans'. As for the relationship between serum bilirubin and diabetic nephropathy, we first showed the lower prevalence of vascular complications, including nephropathy in diabetic patients with Gilbert syndrome, a congenital hyperbilirubinemia, as well as reduced markers of oxidative stress and