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Kidney failure after treatment with ^{90}Y-DOTATOC

Dear Sir,

We read with interest the case report of Cybulla and coworkers [1] and the comprehensive editorial comment [2] on a case of kidney failure after ^{90}Y-DOTATOC therapy, and strongly feel that some comments and clarification are needed. Certainly, tumour therapy often – if not always – appears to be like sailing between Scylla and Charybdis. Complete tumour remissions would most often be achieved with a number of therapeutic agents if the dose-dependent side-effects could be neglected. The knowledge of tubular re-absorption of peptides and, thus, potential radiation-induced kidney toxicity in radiopeptide therapy is not new. The Basel experience began in 1996, when the first patients were treated with ^{90}Y-DOTATOC. Initial results regarding tumour response and symptomatic relief were promising, but it became evident that kidney protection was necessary [3]. From multiple studies it is known that an amino acid solution is able to reduce renal tubular uptake of labelled peptides or antibodies [4, 5, 6, 7]. Since the middle of 1998, each patient treated in Basel has received a Hartmann-Hepa 8% solution [Ringer-Lactate Hartmann (500 ml), Proteinsteril Hepa 8% (1,500 ml), and Mg 5-Sulfat 10% (30 ml)] for kidney protection, beginning 30 min before the therapeutic injection and in each ^{90}Y-DOTATOC treatment session.

The patient to whom Cybulla et al. [1] refer was treated in the transitional period; unfortunately she received kidney protection only in the last of the four treatment sessions. An important detail in the history of this patient was not mentioned by the authors or escaped their notice: she suffered from bilateral hydronephrosis after recurrent urinary tract infections prior to the ^{90}Y-DOTATOC treatment. The fate of this particular patient is known in detail to us, and was an essential part of two earlier publications from this hospital [3, 8]. The publication by Moll et al. [8], which surprisingly is not quoted in the case report, deals exclusively with the topic of renal thrombotic microangiopathy following ^{90}Y-DOTATOC treatment; this indicates the high importance given to the issue in our department. The report of Cybulla et al. [1] is thus the third publication to deal with this patient in particular.

During long-term follow-up of up to 5 years in nearly 400 patients, renal insufficiency after ^{90}Y-DOTATOC therapy has not appeared frequently. It is conceivable that there might be a correlation between the development of renal failure after ^{90}Y-DOTATOC treatment and tumour mass, the somatostatin receptor density of the tumour, the health status of the patient, prior chemotherapy (especially with carboplatin and methotrexate), external beam irradiation or other forms of internal radiotherapy (e.g. radioiodine). A publication on long-term efficacy and safety data is in internal revision.

Decision making in desperate situations of progressive disease is always like sailing between Scylla and Charybdis, the potential benefit of treatment being weighed against the generally low risk of a potentially harmful side-effect. The decision on the use of ^{90}Y-DOTATOC therapy has to be reached in discussions between the patient, the referring physician and the nuclear medicine department.

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References

1. Cybulla M, Steiner SM, Otte A. End-stage renal disease after treatment with ^{90}Y-DOTATOC. *Eur J Nucl Med* 2001; 28: 1552–1554.
2. Boerman OC, Oyen WJG, Corstens FHM. Between the Scylla and Charybdis of peptide radionuclide therapy: hitting the tumor and saving the kidney. *Eur J Nucl Med* 2001; 28:1447–1449.
3. Otte A, Herrmann R, Heppeler A, Behe M, Jermann E, Powell P, Maecke HR, Muller J. Yttrium-90 DOTATOC: first clinical results. *Eur J Nucl Med* 1999; 26:1439–1447.
4. Hammond PJ, Wade AF, Gwilliam ME, Peters AM, Myers MJ, Gilbey SG, Bloom SR, Calam J. Amino acid infusion blocks renal tubular uptake of an indium-labelled somatostatin analogue. *Br J Cancer* 1993; 67:1437–1439.
5. Behr TM, Sharkey RM, Juweid ME, Blumenthal RD, Dunn RM, Griffiths GL, Bair HJ, Wolf FG, Becker WS, Goldenberg DM. Reduction of the renal uptake of radiolabeled monoclonal antibody fragments by cationic amino acids and their derivatives. *Cancer Res* 1995; 55:3825–3834.
6. Behr TM, Goldenberg DM, Becker W. Reducing the renal uptake of radiolabeled antibody fragments and peptides for diagnosis and therapy: present status, future prospects and limitations. *Eur J Nucl Med* 1998; 25:201–212.
7. Bernard BF, Krenning EP, Breeman WA, Rolleman EJ, Bakker WH, Visser TJ, Macke H, de Jong M. D-Lysine reduction of indium-111 octreotide and yttrium-90 octreotide renal uptake. *J Nucl Med* 1997; 38:1929–1933.
8. Moll S, Nickeleit V, Mueller-Brand J, Brunner FP, Maecke HR, Mihatsch MJ. A new cause of renal thrombotic microangiopathy: yttrium 90-DOTATOC internal radiotherapy. *Am J Kidney Dis* 2001; 37:847–851.