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EDITORIAL

The pharmacist and quality of cancer chemotherapy

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Cancer chemotherapy is a delicate balance between efficacy and toxicity since the concept of chemotherapy is to exploit the subtle, at best, higher sensitivity of cancer compared with normal cells to the effect of cytotoxic drugs. Thus, the therapeutic index for this kind of treatment is very narrow and the cruising between insufficient efficacy and potentially lethal toxicity to reach an optimal therapeutic effect is an advanced task [1].

When it comes to factors decisive for the quality of chemotherapy, the issues most often discussed are the optimal selection of drugs and regimens, taking tumour and patient properties into consideration, and how to handle the great interindividual variation in the pharmacokinetics of cytotoxic drugs [1,2]. Bremberg et al. in this issue of Acta Oncologica discuss other less frequently addressed issues of importance for the quality of chemotherapy, i.e. the organization and routines for chemotherapy prescriptions and the quality surveillance of these prescriptions in routine cancer care [3].

Bremberg et al. present and discuss the results from an inventory at an oncology day-care unit administering routine chemotherapy at a Swedish university hospital. The aims of the inventory were to study the frequency and reasons for treatment modifications of chemotherapy for various solid tumours, mostly breast and colorectal cancer. More specifically, they studied whether the modifications were in accordance with local treatment protocols, were documented in the medical files and prescription cards and if, according to the medical files, potential drug interactions were considered and influenced the prescriptions.

Treatment modifications, mostly dose reductions, were common; 38 modifications in 31 of 93 patients treated during the observation time were observed. Only two modifications were in accordance with the local protocols and the reasons for modification were documented in the medical files for only 11 patients. Furthermore, according to the medical files, potential interactions with the patients' regular drugs were not considered for any patient and crucial laboratory tests reflecting major organ function were frequently missing. The authors conclude that more emphasis should be put on identification of drug interactions, on documentation of the reasons for chemotherapy modifications and that the local treatment protocols should be improved to include relevant information for the prescription of cytotoxic drugs.

The strength of the Bremberg et al. paper mainly lies in the bringing up of seldomly discussed issues, i.e. the routines for chemotherapy prescriptions, and indirectly the role for the pharmacist in this procedure, rather than in the results *per se*. With respect to the latter, the frequency of dose modifications reported is not unexpected. The poor documentation in the medical files of the reasons for modifications is also not surprising given the way the chemotherapy prescriptions were organized at the day-care unit studied and local protocols can reasonably not contain all details on how to modify chemotherapy once it has started.

The lack of documentation observed does not necessarily mean that the chemotherapy provided had sub-optimal quality. No outcome data in terms of efficacy and safety were reported and it might be

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that all modifications were scientifically and clinically completely sound and, thus, were to the benefit of the patient. Admittedly less probable, all potential interactions could have been considered at the prescription of the cytotoxic drugs without leaving the mind of the oncologist to be put into a retrievable document.

The more interesting part of the paper is the description of the routines and organization for the prescriptions at the day-care unit studied and the potential quality consequence thereof. The oncologist on duty was apparently set to prescribe approximately 11 treatments per day for patients with different tumour types, hardly covered by expert knowledge for each, reasonably without personal knowledge about every patient and with the day-care unit's nurses as major informants on the patients' status. Consequently it is claimed that "information about the patient status given to the doctors by the nurses often result in treatment modifications and also that such modifications are not always documented".

According to my experience such organization for prescribing chemotherapy at oncology day-care units is common but should be avoided. Not only may it lead to poor documentation of reasons for treatment modifications, as observed in the paper, but also to inappropriate dose reductions/delays or too high dose-intensity. Unfortunately, prescribing chemotherapy is in practice often considered to be a simple non-intellectual matter of repeating the figures from the previous course without appropriate access to relevant laboratory data, without recent personal experience from the patient and without sufficient time for retrieval of crucial clinical data and clinical judgement.

Given the potential importance of decisions on dose, treatment intervals and treatment duration, prescribing chemotherapy should be upgraded to be considered as an advanced task and organized so that the prescribing oncologist is highly experienced in medical treatment of the tumour type in question, has immediate access to critical laboratory data and recent personal experience from the patient for which the chemotherapy is prescribed.

Is there then a role for the pharmacist to improve the quality of chemotherapy prescriptions and, thus, to improve medical cancer treatment? Bremberg et al. do not discuss this issue extensively. However, in the introduction they refer to their own recent publication on the experience from having a pharmacist as part of the health care team at an oncology ward to give advice on drug related problems. In that setting the pharmacist clearly seemed to provide useful expertise on how to handle such problems [4].

Can such experience also be extrapolated to chemotherapy prescriptions? In my opinion, probably yes. One obvious role for the pharmacist is the routine check up to avoid that simple prescription mistakes reach the patient in the form of much too high or too low doses. Another is to provide advice on pharmacokinetic – pharmacodynamic relationships specific for individual drugs, which may lead to dose adjustments based on individual patient characteristics [5].

Yet another area in which the oncologist clearly needs support, as also pointed out by Bremberg et al., is the identification of potentially clinically relevant interactions between cytotoxic drugs and the patient's regular drugs but also complementary and alternative medications. This is an area in which I think most oncologists' knowledge is very limited and supporting expertise is needed, in person by a pharmacist specialised in the field and/or as a module in computerised expert systems for chemotherapy prescriptions.

When it comes to the involvement of the pharmacist in some kind of general quality surveillance role in which the pharmacist should check the oncologist's dose modifications against the medical file and whether they are in accordance with local treatment protocols, I am more sceptical. Reasons for treatment modifications should be documented in the medical files but it seems unrealistic and unnecessary to cover all reasons in local treatment protocols and prescription notes. Treatment modifications have a number of reasons and this knowledge and its application in the specific patient is a part of the oncologist's expertise. Rather than spending resources to locally document this knowledge, the oncologist should be given ample of time to be able to judiciously apply this knowledge in the individual patient when prescribing cytotoxic drugs.

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