Blood sampling at home: a pilot project

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SUMMARY

Haematological and biochemical parameters are two of the important factors for safely administering oncological medication. These values should be available to the oncologist prior to administration of anticancer drugs in order to decide if they can be administered safely or if a dose reduction or postponement is necessary. In this project, the possibility of a blood sampling at home by a home care organisation 48-72 hours before the patient's contact with the oncologist was evaluated to ensure that these parameters were available at the moment of consultation and to integrate these results in the patient electronic file.

From January 9, 2017, until April 30, 2017, 418 blood samplings were performed at home. Problems were not frequently encountered (4.7% of blood samplings). The pros and cons of this project are discussed. This project demonstrates that blood sampling at home is feasible and that the oncologist receives the required parameters in due time to ensure safe prescription and administration of anticancer medication.

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INTRODUCTION

Anticancer medication is one of the important treatment modalities in oncology. Anticancer drugs are mainly given by oral, subcutaneous, or intravenous route if certain conditions are fulfilled.[1] One of these conditions is that haematological (e.g., leucocyte, neutrophil and platelet counts) and biochemical parameters (e.g., liver function tests, renal function) are within acceptable limits, in order to safely administer these drugs and to limit their toxicity.

The analyses of blood samples are best done within 48 hours before the administration of a treatment to give an exact reflection of these parameters.

The availability of fast analysing equipment in the laboratory or in the day care centre ensures that these parameters are known to the oncologist to decide whether or not a patient can receive treatment. However, even with the availability of these fast analysing systems, the determination of some of these parameters can take up to two hours or longer.

This results in waiting time before the pharmacy can start to prepare the medication. In addition, the preparation of anticancer drugs will be more complex due to new European Union regulations, so that this medication in many centres will have to be prepared 24 hours in advance to distribution to day care centres.[2]

In this project, the possibility of blood sampling at home by an existing home care organisation was explored in order to make haematological, biochemical and some clinical parameters available to the oncologist at least 24 hours before the patient was seen, so that he/she could prescribe

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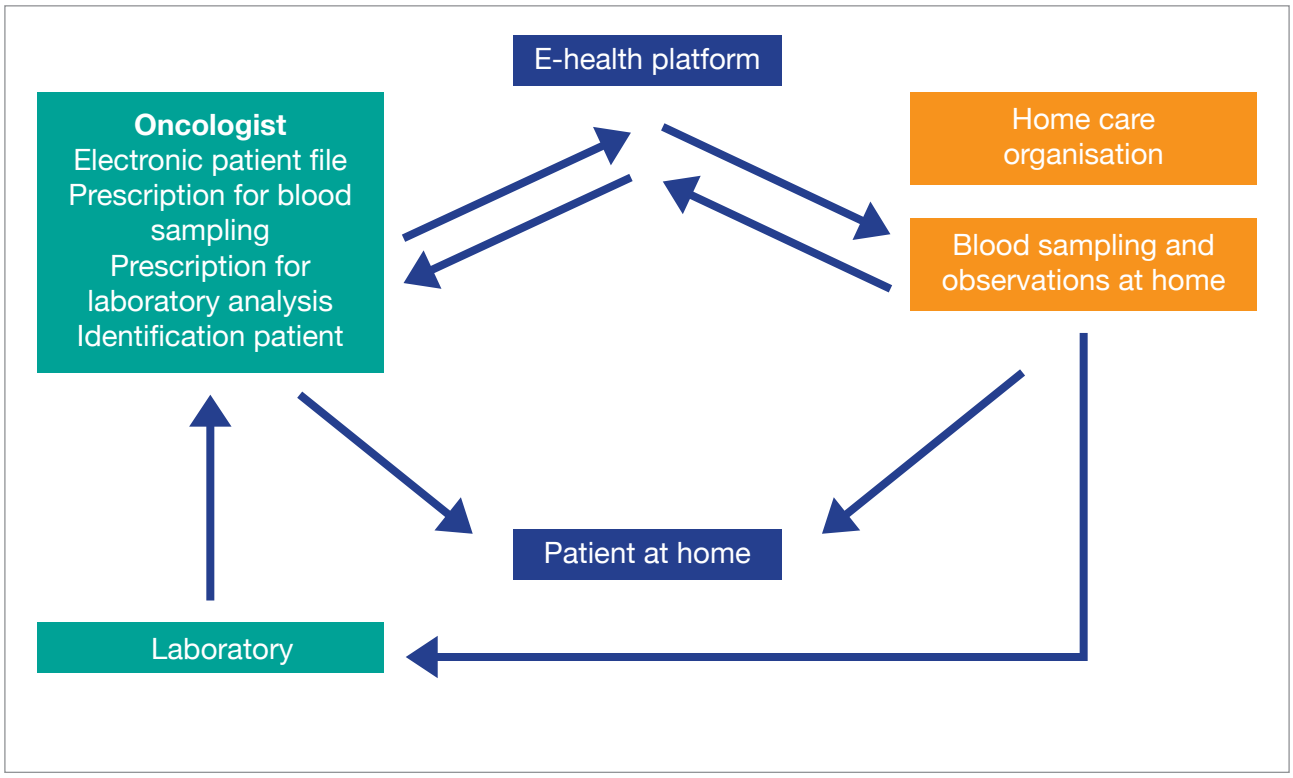

FIGURE 1. Flow among different participants.

and order the medication and that the pharmacy would be able to prepare the treatment schedule.

METHODS

The department of Medical Oncology of the Ziekenhuisnetwerk Antwerpen (ZNA) initiated a project in which blood sampling and collection of clinical parameters were performed at home, so that the oncologist got these results at least 24 hours before the consultation of the patient in the electronic patient file. This could enable her/him to prepare the schedule with an electronic program (Cytoweb®) well in advance and to offer the possibility to the pharmacist to prepare the drugs before the patient was seen at the consultation.

After consulting with the responsible persons of the laboratory of ZNA and receiving the permission of the local management, the project was started.

This included the development of a specific form to request a blood sampling and to perform a specific anamnesis related to clinical factors. This form could be send immediately from the patient file via the e-health platform to a home care organisation for each individual patient, each time a blood sampling had to be performed. The form contained the identification of the patient, the address, the contact phone number, the blood sampling date and a note if the patient could or could not have eaten.

A procedure was developed for the oncologist in relation to the blood sampling at home. This included above described procedure, the information for the patient and an oral informed consent that the patient was willing to perform the blood sampling at home. At the same time, a document with information for the patient was made.

All anticancer treatments (e.g., targeted therapy, hormonal therapy, chemotherapy with different schedules (e.g., 1-3 weekly) and follow-up visits were included in the project.

The oncologist had to send the form for requesting a blood sampling at home electronically to the home care organisation, give a copy to the patient together with a laboratory form, which analyses had to be performed, and a series of stickers with the patient identification.

Each participating oncologist was trained in the process of completing the form requesting the blood sampling and sending it to the home care organisation.

The results of the blood sampling had to be available in the ZNA electronic patient file.

For the home care organisation, a protocol with specific requirements was prepared. These requirements were as follows:

- The home care organisation should use an electronic nursing patient file.
- The home care organisation should be able to contact the patient to make an appointment to perform the procedure.

TABLE 1. Problems encountered during the project (n=418).

Item	Number (%)
Patient not contacted by ZA	9 (2.1)
Blood sampling not correctly requested by the oncologist	1 (0.2)
>2 time venous puncture	6 (1.4)
Blood sampling not possible to perform by nurse)	3 (0.7)
Clotted sample	1 (0.2)
Total	**20 (4.7)**

- The nurse should only try twice to perform a successful peripheral venous puncture.
- The samples should be transported to a laboratory of the ZNA within four hours after sampling.
- Specific clinical parameters should be collected by the nurse and the data should be sent to the ZNA electronic patient file via the e-health platform. In case of clinical values outside predefined limits, the nurse should contact the oncologist by phone to receive instructions on how to proceed.
- The oncologist should be informed by email that a blood sampling was performed by the nurse.

For the laboratory, the procedure informing the oncologist of values that were outside predefined levels was also applicable for blood sampling at home.

Figure 1 shows the communication flow of the project.

A call was made to specific home care organisations in order to obtain a budget proposal according to the project requirements. These costs were funded by the ZNA laboratory.

Before the project started, the general practitioners were informed by the electronic newsletter of ZNA.

RESULTS

A call was made on July 14, 2016, to selected professional home care organisations in the Antwerp region (e.g., Solidariteit voor het gezin, Remedus, Witgele Kruis Antwerpen, Zorgbedrijf Antwerpen) with a deadline for proposals set on August 15, 2016.

Based on the proposals, the 'Zorgbedrijf Antwerpen' (ZA) was selected. After training the nurses of the ZA in relation to the communication flows, blood sampling practicalities and blood sample transport, the project started on January 9, 2017.

From January 9, 2017, until April 30, 2017, 418 blood samplings were performed at home. The problems that were encountered are given in *Table 1*.

ORGANISATION ZORGBEDRIJF ANTWERPEN

The planning of the blood sampling at home proved to be very complex for the ZA because nurses had to reschedule their regular duties, in order to perform the blood sampling in due time, and because new nurses had to be recruited for this project.

Because of the limited number of blood samplings during this project and the reimbursement per blood sample taken, the fee was insufficient to cover the costs for ZA.

COMMUNICATION FLOW

Some of the blood samples, prescribed in January and February 2017, were not performed as a result of organisational problems at ZA, or because the oncologist did not send the request electronically to ZA.

At the start of the project, the clinical evaluation was not sent to the ZNA in time.

Sometimes, the prescribing oncologist was not reachable when the nurse had a problem at home.

COMMUNICATION WITH THE GENERAL PRACTITIONER

One general practitioner had questions related to the project costs for the blood sampling, since the patient was also registered at the practice for nursing care. The cost of the blood sampling was covered by the ZNA laboratory, so no extra costs were created for the general practitioner's practice.

COVERAGE OF THE PATIENT POPULATION

ZA was only active in certain municipalities of the province of Antwerp and 28.7% of the 2,822 patients, cared for by ZNA oncologists, could not be included in the project.

NURSING-RELATED PROBLEMS

At the start of the project, a learning curve was observed in

KEY MESSAGES FOR CLINICAL PRACTICE

1. It is possible with existing home care organisations to perform a blood sampling and a clinical evaluation of cancer patients at home.
2. The e-health platform can be used for communication between the home care organisations and the hospital departments.
3. The integration of external data is possible in the electronic patient file, enabling the oncologist to make a prescription for medication 24 hours before the patient should receive an anticancer treatment.

relation to blood sampling. Some of the patients could not be sampled at home because of difficult vascular access, and in some cases, the nurse performed a venous puncture more than twice.

PATIENT-RELATED PROBLEMS

Three patients refused a blood sampling at home because of privacy reasons or because they did not want to wait at home for the sampling.

Some of the patients lost the documents, and the nurse did not know which blood samples to take.

Most of the patients were satisfied in relation to the time and method of blood sampling.

DISCUSSION

The complexity of the organisation of oncological care is increasing because of more stringent safety guidelines and the preparation of anticancer medication in advance.

This project studied the possibility to perform a blood sampling at home prior to a control or an oncological treatment in order to ensure that the oncologist had all haematological, biochemical and some essential clinical parameters in the electronic patient file, so that the medication prescription could be made 24 hours before the patient came to the hospital.

Beside some minor exceptions (*Table 1*), this system did go ahead without major problems.

The advantage of this approach is that the oncologist can send an electronic request via the electronic patient file to the home care organisation, and that the results required to make a treatment decision are in the patient's file at least 24 hours before the patient came to the hospital.

The communication between the home care organisation and the patient went well in most cases, and the waiting time for the patient at home was limited to a minimum.

Most patients were satisfied with the procedure at home, and only three patients refused to let the blood sampling to be performed at home. The patients were warned when the nurse would come to perform the blood sampling, and in all cases the appointment could be realised at the time the patient wanted.

Only one general practitioner had a question on the project costs, and, after explaining the procedure, she did not had a problem to let the blood sampling be performed by nurses of the ZA.

A disadvantage is that the oncologist has to perform an additional administrative task, which is not reimbursed, but by using the electronic file, this was done in an efficient manner. Since the oncologist is delegating a task to the nurses, he is also medico-legally responsible for the procedure.

Another problem was the electronic system of the home care organisation because when this does not function well, some of the information (e.g., which patient is to be sampled) can be lost.

On the initial form for requesting a blood sampling, the contact phone number of the home care organisation was not available, making it difficult for the patient to contact the organisation in case of an unforeseen problem. In a newer version, the phone number was added.

Also, a form was created to cancel a requested blood sampling if the situation of the patient changed (e.g., intercurrent hospitalisation).

The subcutaneous device could not be used to draw the blood and patients had to undergo a venous puncture. Most patients did not mind this procedure. There was a learning curve for the nurses to perform a blood sampling and at the start of the project, some patients had to undergo more than one venous puncture. Patients with known difficult venous access will be excluded in future.

The project was not cost-effective for the home care organisation and it remains to be seen if the number of patients sampled at home will be sufficient to make the project financially self-supporting.

All oncologists involved in the project received an email via a group mailing box when a patient was sampled while it did

not concern their individual patients. In the future, there will be an adaptation of the system, so that only the prescribing oncologist will receive such an email.

In the laboratory, there were problems with incorporating the data in the electronic patient file and the automatic tarification of the analysis, because there was no current contact number of the patient. This was caused by the fact that the prescribing oncologist did give an identification label to the patient with the contact number of the time of consultation, and that this was different from the date of the blood sample analysis. The laboratory administration had to create manually a new patient contact number in order to get the patient in the system for tarification. The IT department is looking into the problem of transmural information exchange.

CONCLUSION

This project proved that is was possible to perform a blood sampling and collect clinical parameters at home and to integrate the resulting data in the electronic patient file.

The project was positively evaluated and is extended to the other oncology facilities of ZNA.

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