IT support for monitoring the patient along the clinical pathway

Introduction

In modern healthcare clinical pathways are used to predict, describe and monitor the treatment of individual diseases. Most clinical pathways still exist in paper format. IT support for the patient along the clinical pathway opens up new opportunities for faster, cheaper, more reliable and patient-friendly treatment.

Picture 1.

What are clinical pathways?

A clinical pathway is a tool which is based on evidence-based medicine, medical care and characteristics of an individual organization. It lays out the standard plan of multidisciplinary medical treatment of different types of patients with a specific illness or planned procedure. As a plan for treatment of a patient with a specific illness, a clinical pathway lays out the activities which need to be done by the medical team at a given stage of the treatment process. One component of the clinical pathway is a comprehensive documentation collected along the various steps along the clinical pathway. This includes the collective work of the medical team, therefore it must be user-friendly, transparent, and it must ensure good applicability in work procedures.

Picture 2.

Why the need for IT support?

Slovenian hospitals have already begun to establish clinical pathways and there are a number of descriptions of clinical pathways for particular selected diseases, however these are still in paper format. Normally the clinical pathway for hospital treatment of specific diseases is based on days. Each day has a more or less formalized set of tasks which need to be performed on the patient, as well as a corresponding set of data collected at this stage of treatment.

With the use of modern ITC technology there are practically no more reservations against creating an electronic version of these pathways. On the one hand, a computerized solution would cover the procedural aspect of the clinical pathways by guiding the user along and suggesting activities which need to be performed, and it displays the status, history of procedures already performed and those which still need to be performed. On the other hand the computerized solution covers the data aspect, as it helps the user collect relevant data and view the data collected in a suitable manner.

Monitoring clinical treatment of a patient with chronic Hepatitis C.

For the purposes of the physicians working at the Department of Infectious Diseases of the University Medical Center Ljubljana, we developed IT support to monitor patients with chronic Hepatitis C. This disease is caused by the Hepatitis C virus and can cause liver damage such as cirrhosis and cancer.

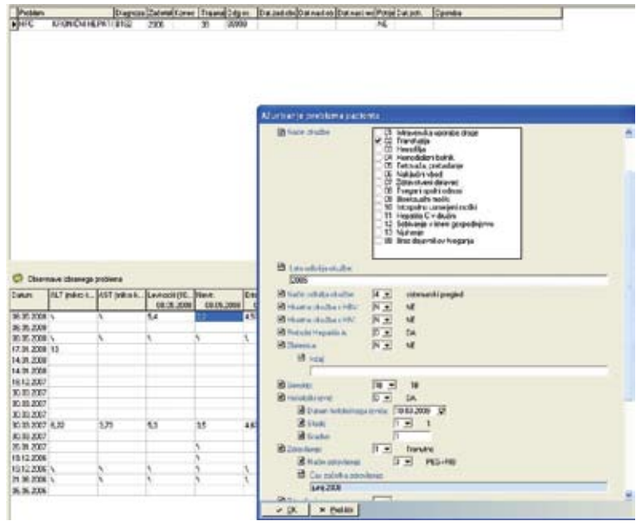
Because the majority of patients with chronic Hepatitis C are treated as out-patients, we focused on this part of the procedure. In their work the physicians are met with extensive medical documentation on the patient, from which they are then required to extract the essential data of interest which affect further treatment. Each time the patient visits the clinic, they are interested in the record about the previous visit, the lab results from a few important tests which indicate the status of the disease and the patient's general medical condition. For chronic patients such as these, the volume of paper documentation can be overwhelming and searching through it can be time-consuming, placing an additional burden on the physicians and taking away time for direct contact with the patient.

In preparing an IT solution to support treatment of chronic Hepatitis B patients, the physicians required the solution to provide them with all essential data they need in the procedure. They also wanted a simple and time-efficient access to these data and they wanted to have access to such data for expert analysis and further study.

IT support in the treatment of Hepatitis C

The desire of the physicians for a simple procedure was considered as we designed the IT support within their information system. The solution thus ensures that the patient is automatically placed on the clinical pathway for Hepatitis C as soon as the diagnosis is confirmed. Similarly, on their subsequent visits to the clinic, any patient with this diagnosis is automatically put on the clinical pathway and added to the list of the patient's visit for treatment of this particular ailment.

Picture 3. Screenshot with information on the patient's problem

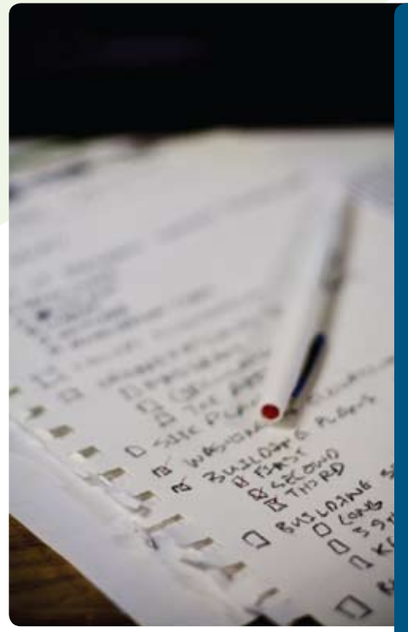


When enlisting the patient on the clinical pathway, data on their disease and treatment begins to be collected and monitored. At each examination, the results of certain lab tests and other relevant data are stored in a list which the physician can then view in a transparent table view (Figure 1). A historical overview of the results can also be viewed in graphic mode.

In addition to reviewing the data from each of the visits, we also prepared the so-called "ID Card" of chronic Hepatitis C - this is a summary of the basic information about the disease for the individual patient. It combines different kinds of data - from the manner and time of infection, accompanying diseases, diagnostic process and results, and any treatment administered (Figure 1).

The IT solution also supports the physician's work process, as it suggests those activities which are anticipated at a certain stage of the clinical pathway while at the same time

Picture 4.



The power of lists

A simple checklist of tasks can greatly increase the effects of treatment.

Intensive care specialist Peter Pronovost introduced an intensive care checklist protocol for inserting catheters. They realized that at least one of the steps on the checklist had been neglected with more than one-third of the patients. Staggering results were achieved after introduction of the checklist procedure, decreasing the rate of catheter infection from 11% to 0%.

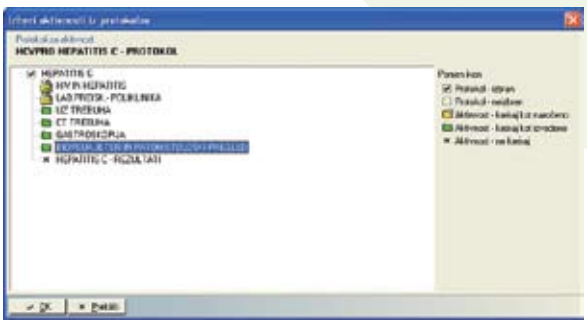
Additional checklists have helped to reduce the number of patients receiving unsuitable treatment for pain from 41% to 3%, as well as the percentage of patients on mechanical ventilation not receiving recommended care from 70% to 4%. It was determined that hospitalization times could be halved simply by following the checklist daily.

Pronovost is now introducing checklists another hospitals, but is often met with resistance and skepticism. If a new drug was this efficient at saving lives as checklists are, says Pronovost, there would already be a national campaign urging doctors to use it.

Source: »The Checklist« Atula Gawande, The New Yorker, Dec 2007.

allowing them to use their professional judgment and adapt the procedure to the patient's needs depending on the specifics of the case at hand (Figure 2). Thus, when ordering tests to be done in the biochemistry lab, the system suggests a set of "routine" tests which are normally ordered, while at the same time it allows the user to edit, add to or modify the procedure as needed. In addition to the text format of diagnostic test results, we also prepared a dataset with a predefined array of values, allowing later processing in expert analyses.

Picture 5. Work process window



Scheduling for medical check-ups is done via the electronic scheduler which makes it easy to find the next available slot for the patient's check-up.

All medical data collected in such a way can be further analyzed.

IT support allows hospital workers to monitor patients with this disease in a standardized, rationalized and efficient manner.

Advantages of electronic clinical pathways

The principles of IT support for monitoring patients with chronic Hepatitis C are general and are not limited to this disease only. We can monitor patients with other diseases in a similar manner as those with chronic Hepatitis C. The collected data about the patient's condition and a comprehensive table view of essential medical data which we wish to monitor allows us to determine the patient's current medical condition. The proposed activities to be carried out at this step along the clinical pathway would make their selection, execution and logging easier. We can collect the necessary medical data when performing any of these activities. Expert analysis can help us determine deviations from the planned clinical path and determine further potential for improvement of the clinical pathway itself, as well as find other co-dependencies between data collected which are not visible in the treatment of individual patients. This manner of monitoring the patient's treatment opens up new opportunities for better IT support of the work of doctors and other medical staff.

Summary

Clinical pathways are used in healthcare to plan, describe and monitor medical treatment and patient care suffering from specific medical conditions. The transition from paper to electronic monitoring of the clinical pathway brings new advantages shown in a unified, efficient and better treatment of patients.

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