Association for Ukrainian Telemedicine and eHealth Development

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Good Practice Model
TELEMEDICINE FOR MULTIDRUG-RESISTANT
TUBERCULOSIS CARE

Aim

Improvement of multidrug-resistant tuberculosis (MDR-TB) managing.

Backgound

The accepted system of MDR-TB care is based on strict clinical protocols and special management measures. In most countries, decisions are made by a special medical commission (SMC): a primary diagnosis of MDR-TB has to be confirmed by the commission and only after that can a patient receive medications (sometimes this process takes a few weeks). During the subsequent two years of treatment, reviews have to be carried out every 2 months and any side-effects or complications have to be examined. This approach allows control and cure of the infection. In the Ukraine, the SMC meetings require all medical documents to be transported to a regional hospital for a few days. Such approach entails risk of physical damage, personal data leaks, besides the documents being unavailable for the local hospitals. During the SMC's meetings, a local medical practitioner presents all the patients. This presenter cannot be well informed about all details of the patients from every hospital. Thus, the present system incurs delays and risks.

System Description

Hospitals and medical establishments which provide care for a patients with MDR-TB connected by closed network (at least 4 Mbit/s).

Electronic health record (EHR) system or closed e-mail server used for medical documentation exchange. Alternatively, a special system for automation of SMC's working process can be used. The process is "submitting of patient documentation on SMC meeting and consultation". The system has functions of process initiation, accomplishment tracking and control, health records exchange, feedback and monitoring.

Desktop videoconferences used for live interactions between SMC and local medical practicioners. e-Works software could be recommended because it has in-built support for DICOM content sharing

In case of closed e-mail server usage all data should be protected by digital signature.

All tools are functionally integrated by web-portal.

A typical telemedicine meeting of the SMC comprises:

1) uploading of medical documents and images into the secure EHR system,

2) analysis of clinical cases, including image review via teleradiology where required,

3) presentation of patients by a local attending doctor via videoconference,

4) videoconference with individual patients, if required,

5) final decision making, documentation.

The telemedicine network allows electronic document exchange, storage and tracking, direct communication with attending doctors, patients, and epidemiological monitoring.

<u>Example of the Model Realisation</u>

An anti-tuberculosis telemedicine network was created in the Donetsk region of the Ukraine. It connects four local centres for MDR-TB treatment (Kramatorsk, Mariupol', Shakhtarsk and Gorlovka), one regional anti-tuberculosis hospital in Donetsk (the headquarters of the SMC, regional MDR-TB expertise and treatment centre) and the Donetsk National Medical University (which provides certification and teaching for telemedicine, network monitoring and efficiency evaluation, general and technical support). The closed high-speed network (100 Mbit/s) was constructed especially for the purpose of anti-tuberculosis telemedical work. Desktop videoconferencing is used, and the software provides support for DICOM images (http://www.e-works.com). The web portal of the network

(http://www.itub.dn.ua) allows access to the videoconferences. An electronic health records (EHR) system was specially created for the network (created on the a2-platform (http://www.a2.dn.ua)), which is available via a separate link. This system allows not only electronic work-flow, but automation of working processes, task and documents control, actions logs and protocols.

During the first two months of operation, there were up to 300 telemedicine sessions in the network. After 1 months of network operating local administrative improvements (e.g. integrating the telemedicine meetings into the official SMC schedule, and guidelines for the hospitals involved) have been done. We studied 277 patients for whom full clinical and other related data were available. The patients (202 males, 76 females) had a mean age of 39 years (range 2-90). The main reasons for a teleconsultation were: primary confirmation of diagnosis and approval of treatment (32%), monitoring of treatment at Stage 1 (53%) and at Stage 2 (3%), final control (6%), management of complications and treatment interruptions (6%). We found that the diagnosis was changed in 12,3% of the telemedicine cases, but there were no time delays. All patients receive medication very quickly.

We are focused on technical quality and diagnostic possibilities of the Network, so classical indicators had been evaluated:

- Performance Acceptability Ratio (PAR) for total (Gross PAR (G-PAR)) and non-critical (Net (N-PAR)) technical fails,

- system acceptability (Ac) for digital x-rays (ratio: number of readable x-rays received/total number of transmitted x-rays).

The system acceptability for digital x-rays takes 0,9, this value can be defined as good. From the technical point of view the telemedicine system operates rather stable according values of G-PAR - 99% and N-PAR - 80%. Thus, the main quality indicators shows good efficiency of the Network.

Acknowledgment

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