Curatio Sine Distantia!
Telemedicine networks in Ukraine - how we made telemedicine real

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President of Association for Ukrainian Telemedicine and eHealth Development
eHealth and telemedicine in Ukraine

- 1968-1970x - medical cybernetics and health records for computers
- first tele-ECG center in 1969
- modern telemedicine since 1999
- last 3-4 years – lawful base for telemedicine and eHealth
- Association for Ukrainian Telemedicine and eHealth (national membership in ISfTeH)
- national tele-ECG industry
- national-wide tele-ECG network “Telecard”
- wireless tele-ECG for ambulances
- national-wide VC-based network “Mobile medicine”
- regional telemedicine networks in Donetsk, Dnepropetrovsk, Lviv, Odessa, Vynnytsa, Volyn etc…
- telemedicine scientific center in Donetsk
- “Ukrainian Journal of Telemedicine and Medical Telematics” (since 2003)
- annual international telemedicine conferences in Donetsk (since 2005), in Lviv (since 2007)
- official postgraduate studying for telemedicine
- clinical telemedicine projects and networks in traumatology and orthopedics, dermatology, MFS, neonatology, tuberculosis, posture disorders telescreening…
• Principles of telemedicine network organisation

• Telecardiology

• Teletrauma

• Teleneonatology

• Typical Regional telemedicine network

• National telemedicine network
Telemedicine consultation (teleconsultation) – remote discussion of the clinical case via special computer information and telecommunication system to get answers to precisely formulated questions for the help in clinical decisions.

**Telemetry** – transmission of physiological data

**eLearning** – knowledge improvement in process of teleconsultations.
CHOICE OF TECHNOLOGY

Targets
- Clinical problems
- Care availability
- Special care experts
- Etc...

Geography
- Distances
- Geography peculiarities
- Mobility
- Etc...

Resources
- Available equipment and communication
- Budget
- Economical efficiency
- Etc...

Psychology
- Readiness of personal
- Readiness of patients
- "Direction" of work
- Etc...
Digitalisation of medical information

Sending information to remote expert

Additional questions. Sending of additional data

Answer receiving

Notification about results
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Targets and features analysis

Exist infrastructure analysis

IP analysis: availability, quality, safety

Add IT-devices

Add special devices

Start telemedicine

Combination
Documentation
- national eHealth and Telemedicine policy
or
- national health care and information policy
or
- international recommendations
and
- agreements in frame of projects, networks etc

Learning for telemedicine skills
*Do not re-invent the wheel!*

Quality evaluation
Methods for the efficiency analysis
TELEMEDICINE AND CARDIOLOGY

Professionals have to help each other!
Clinical targets…

Management targets…

Features…

- Needs for fast diagnosis and decision about trombolisis
- Primary level and ambulance cars – teams without doctors
- Primary level – GPs need advice
- Lack of knowledge (de jure VS de facto)
- Needs for very easy and very fast technology
- Internet and computers availability

Telemetry + Teleconsultation = Tele-ECG

“Primitive”-to-use 12-channel devices
mainly working on phone-lines

High noise-immunity

rural hospital, let's take a walk
1950-1960 – space telemetry

Telemedicine system “VOLNA” (“Wave”)

Analogous system for ECG transmission

30 years of telecardiology
First Tele-ECG center in Ukraine – Poltava, 1969

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Modern digital 12-channel tele-ECG systems originally developed and produced in Ukraine
More than 150,000 tele-ECG consultations in Ukrainian telecardiology networks since 2005 till 1/1/2011
Telemedicine system TELECARD
www.tredex-company.com

- 12-channel ECG
- Digital transmission
- High noise-immunity (even at parallel phone lines)
- One-call teleconsultation
- Easy to operate (one button)
- ECG+Holter+Telemedicine
Telemedicine system UNET

www.utasco.com

- 12-channel ECG
- In-built telemedicine unit
- Wireless transmission in SCP-ECG (EN 1064) standard
- LCD and printer
- Memory
Call-centers based on usual PCs, special modems and EHR
EHR

- Database
- Automatic analysis
- Tools for the manual analysis
- Comparison tool
- Import/Export
- Print, communication etc.
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EHR
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GRID storage
National Technical Science Academy

External access

SCP-ECG

SCP-ECG
Telemedicine Workshop
Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp
28-30 September 2011

ECG - transmitter

Primary hospitals
Secondary hospitals
GPs offices
Transport

Full ECG device

Ambulance cars
TELECARD work places
UNET work places
Regional referral and diagnostic center

Community/Municipal referral and diagnostic center

Rural hospital

Regional level

Rural level

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Cardiology hospital

Ambulance referral center

“Special” teleconsultations (trombolisis)

Ambulance car

“Ordinary” teleconsultations
TELECARD Network

100% of regions (24)

100% of Regional Cardiology Hospital (24)

23 sub-networks based on secondary hospitals (~10 transmitters per each call-center)

5 municipal Emergency hospitals (ambulance cars’ services in 3 region centers and 2 towns)

- number of involved regions and regional hospitals
- in ambulance cars/emergency hospitals
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UNET Network

3 regions

3 municipal Emergency hospitals (ambulance cars’ services in capitol and 2 region centers)

Pilot-project “Wireless Teleneonatology”

- number of involved regions and regional hospitals
- in ambulance cars/emergency hospitals
Functions of TELE-ECG networks

1. Diagnosis
2. Control
3. Learning
4. Management
Heart diseases at Poltava region

Marienko et al, 2007-2009

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Total heart diseases and MI mortality mortality (active TELECARD)

Marienko et al, 2007-2009
### Clinical reasons for tele-ECG teleconsultations

<table>
<thead>
<tr>
<th>Clinical Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarct or chronic ischemia</td>
<td>11-63%</td>
</tr>
<tr>
<td>Different arrhythmias or conductivity disorders</td>
<td>14-57%</td>
</tr>
<tr>
<td>Other cardio-vascular pathology</td>
<td>3-14%</td>
</tr>
</tbody>
</table>

### QUESTIONS

<table>
<thead>
<tr>
<th>Question</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary diagnosis or specification of specification</td>
<td>95-99%</td>
</tr>
<tr>
<td>Opinion after treatment</td>
<td>1-5%</td>
</tr>
</tbody>
</table>
After ECG transmission

Tele-ECG allows to treat patient at local hospital – 76,5-99,5%

Transportation to the III level center after tele-ECG – 0,3-1,8%

Transportation to the III level center after tele-ECG and Expert travel to the patient – 4,7-18,5%
### FAILURES

For $n=7002$ and $n=2444$ tele-ECG failures was in ~ 3,0-3,2%

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous phone disconnection, line noises</td>
<td>1,7%</td>
</tr>
<tr>
<td><strong>Human factor</strong></td>
<td>1,3%</td>
</tr>
<tr>
<td><strong>Software errors, viruses</strong></td>
<td>0,2%</td>
</tr>
</tbody>
</table>

* Electrodes wrong order, patient muscle tremor
1. General part
  1.1. Lawful base
  1.2. Terminology and glossary
2. Tele-ECG Network organisation and management
  2.1. Aims and functions
  2.2. Structure
  2.3. Indications to tele-ECG consultations
  2.4. Policy for call-center organisation
  2.5. Policy for ECG-sending point
  2.6. Documentation
3. Manual of tele-ECG device
4. Efficiency of tele-ECG
For the first time we use tele-ECG system UNET in neonatology practice (Donetsk Municipal Hospital N6)
TELEMEDICINE AND BROKEN BONES
TELE-TRAUMATOLOGY and TELE-ORTHOPEDICS NETWORK IN UKRAINE

Clinical targets...
Management targets...
Features...
War at the Road in Ukraine:

Dead ~ 15 persons per day

Wound ~ 100 persons per day
Donetsk Region - biggest industrial region in Ukraine and Eastern Europe (1000 coal mines and factories)
Population 5.5 mil.

Industrial trauma – 3rd place as cause of disability or death,
1st - for the young people
BAD ECOLOGY

Problems of children’s health including pathology of locomotorium and spine
Problems and Features

• “Centralisation” – best experts and resources are concentrated in big regional cities

• Lack of staff and specialists (neurosurgeon, vascular surgeon, orthopedists, burn, emergency care etc...)

• Lack of resources and infrastructure (no helicopters, only cars)

• Service of “Flying Doctors” is not ideal

• People are dying!
“Easy” - Resource Emergency Telemedicine

Telemedicine Tools for the Fast Team Convoke

“Telemedicine in the Pocket”

Telemedicine screening
Donetsk R&D Institute of Traumatology and Orthopedics
Donetsk Regional Trauma Hospital

300 beds
5,000 surgeries per year
10,000 out-patients

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Easy resource telemedicine

PC + Digital camera + Internet + Guideliness = Telemedicine
1. Skills of picture taking and graphical edition (cutting, palette, size)

2. Requirements to the files

3. Anonimity securing

4. Requiremenets for the X-Ray examinations
   (if NO CT - special positions have to be used, for example for the pelvis, hip)

Nota Bene!

Radiologists doesn’t take part in teleconsultations.
It’s only between traumatologists
No PACS or special software etc…

Distinct from previous researches and projects
Clinical case for teleconsultation

Expert notification

Data sending

Analysis by expert

Recommendations and conversations

Paper documents draw up

SMS

MMS

E-mail

Skype (file sending)

E-mail

Skype
Tools for TeleTrauma & TeleOrtho

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E-Mail

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Welcome to the Ukrainian iPath Telemedicine Server supported by Association for Ukrainian Telemedicine & eHealth Development and Ukrainian Swiss Mother and Child Health Program

The Ukraine telemedicine platform has been designed to foster information exchange and communication between professionals working in the health sector with the following functionalities:

- Create discussion groups related to health topics. Currently there are groups in the field of Perinatology, Trauma Surgery, Telecardiology, etc. allocated on the platform. Within each discussion group the group members can:
  - present and discuss cases (medical or others) in order to exchange information and expert opinions
  - organise consultation services where group members present cases to colleagues who provide their expertise as a second opinion
- Use the telemedicine platform as a Content Management System to collect, store and retrieve various type of documents in a virtual library within the fields of interest of the discussion groups.
- Use the telemedicine platform for teaching and training purposes in the domain of health or health sector related occupations through distant presentations, case based learning, downloadable materials, etc.

All interested professionals and institutions are most welcome to use the services provided by the Ukraine telemedicine platform for their own benefit and create their own discussion groups.

iPath is an Open Source Telemedicine Solution and the program code is freely available on sourceforge.net for download. For more information about the iPath project you may visit iPath.ch.

The Ukraine Swiss Mother and Child Health Program is jointly financed by Ministry of Heath of Ukraine and Swiss Agency for Development and Cooperation.

In case of questions or if you would like to operate your own discussion group on iPath, please contact the system administrator Anton Vladzymyrsky the President of the Association for Ukrainian Telemedicine & eHealth Development (ATUeHD).
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Последствия чрезвертельного перелома бедренной кости

Отправлено Pavel Ivanov 16 Март 2008, 17:13
Здравствуйте, уважаемые коллеги.
Обращаюсь к участникам форума и просим помощи в непростой ситуации.
Пациент 55 лет, европеевец, проживающий в Барселоне. Его жена обратилась с жалобами на боль в бедре, возникнувшую после падения. Врачи госпитализировали пациента в больницу.

Радиоурологическая картина — рис. 2. При кТ-показаниях двоякого, множественного перелома, в области тазовой кости, наложена наложение с помощью гипсовой повязки. Несмотря на некоторую болезненность, пациент может передвигаться самостоятельно.

Через 1 года восстановительный процесс был улучшен. Снова завершил самостоятельное движение.

Пациент обратился в институт им. Н.В. Склифосовского 2 месяца назад. При осмотре: левое бедро укорочено на 1 см, нижняя конечность находится в сгибе.

Рентгенологическая картина — рис. 2. При кТ-показаниях двоякого, множественного перелома, в области тазовой кости, наложена наложение с помощью гипсовой повязки. Несмотря на некоторую болезненность, пациент может передвигаться самостоятельно.

Вопрос: какая схема лечения Вам больше всего по душе?
1 вариант — «Остеосинтез»: Фиксация штифтами с известковым и антибиотиком (не получено).
2 вариант — «Миостериотомия»: Использование костных препаратов, ускоряющих процесс заживления.

Вопросы: как Вы считаете, что лучше всего для данного пациента? Помогите нам советом в этой непростой ситуации. Какой выбрать вариант лечения и как
От: экспротезирование после остеотомии по Шаана
Андрей А. Якунин 27 Март 2004, 15:32

Уважаемый коллега Владимир,  

Спасибо за представленный интересный случай, обсудим его в отделении.  
Назовите свое мнение - проведение клинико-основной остеотомии в зоне дополнительной точки опоры с ее и сопутствующей патологией.  

Показанный случай предлагается на рентгенограмме. Операция выполнена в 1996 г.  

...  

Радио,  
Андрей А. Якунин  
Ортопедический отдел  
Военно-медицинской szkoły № 3  
Москва  

[Ответ]

От: экспротезирование после остеотомии по Шаана  
Виктор П. Волков 03 Март 2004, 01:11  

Уважаемый Анатолий, как я понимаю, при экспротезировании требуется решение проектирования коленного сустава. Своей целью должен быть доступный уровень. Возможный вариант, хотя есть вероятность не одного подхода в 3 аналогичных случаях, а также при необходимости остеотомии для коррекции посадки и укрепления при необходимости отравления, его вставкой/подводной введением коленного ножа(ев). Мне бы предложенно до уровня предложенной остеотомии, которую и выполнить удобным способом, характером деформации. Затем работу в вертикальный вправление (ее и данные данные) и выполнить трансплантат патологоанатомической.
Desk-top videoconferences

Mainly for the non-urgent cases, learning and experience share

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Dr. Andery Sydorenko et al., 2009-2011
Easy-resource telepresence with telemetry for the ICU (injured patients)
Fast team convoke

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MMS allows:

- fast teleconsultations with out-clinic experts (MF surgeon, neurosurgeon, vessel surgeon etc)
- preliminary diagnostic
- choose clinical strategy
- start specific therapy until expert arriving
- Avoid unnecessary calls, transportations, visits
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18 y.o. male after injury in coal mine

MMS-teleconsultation allowed to avoid unnecessary expert call

~ 4 hours (!!!) was saved

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TeleTrauma

Since 2000

permanent TM-links

time-to-time TM-sessions

links in progress

International

Regensburg
Warsaw
Orthogate
Orthoforum

Ukraine

Lviv,
Ivano-
Frankivsk,
iPath-ua

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Since 2000 – more than **800**

teletrauma & teleortho

telemedicine consultations:

- bone-joint injury
- polytrauma
- spine and brain injury
- congenital abnormalities
- bone oncology
- burns

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CLINICAL EFFICIENCY OF THE TELEMEDICINE FOR THE TRAUMA AND ORTHOPEDICS
COHORT RETROSPECTIVE STUDY:
Telemedicine influence to the clinical outcomes
(truma&ortho patients)

Main group («Telemedicine»):
69 patients** - 42 male (61%), 27 female (39%), age 5-72 years

Control group («Control-Center» ***):
83 patients ** - 52 male (63%), 31 female (37%) age 16-77 years

Control group («Control-Hospital» ****):
44 patients ** - 32 male (73%), 12 female(27%) age 16-87 years

* power 95%, validity 1%
** sampling formation by Bland
***Patients from trauma center III level
****Patients from rural and municipal hospitals

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## Telemedicine VS Control-Center

<table>
<thead>
<tr>
<th>Groups</th>
<th>Outcomes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Telemedicine</td>
<td>65</td>
</tr>
<tr>
<td>Control-Center</td>
<td>31</td>
</tr>
</tbody>
</table>

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Telemedicine VS Control-Center

Absolute risk reduction (ARR) of the **bad outcomes** - 0,03

Relative Risk Reduction (RRR) of the **bad outcomes** - 42,9%

Absolute Benefit Increase (ABI) of the **good outcomes** - 0,34

Relative Benefit Increase (RBI) of the **good outcomes** - 1,2

Relative Risk (RR) for the **bad outcomes** 1,03 (>1)

Odds ratio for the **good outcome** 1,72 (CI 0,41-7,12) (>1)

NNT - 33
Telemedicine VS Control-Hospital

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Telemedicine VS Control-Hospital

Absolute risk reduction (ARR) of the **bad outcomes** - 0.19

Relative Risk Reduction (RRR) of the **bad outcomes** - 83%

Absolute Benefit Increase (ABI) of the **good outcomes** - 0.53

Relative Benefit Increase (RBI) of the **good outcomes** - 4.4

Relative Risk (RR) for the **bad outcomes** 1.24 (>1)

Odds ratio for the **good outcome** 6.47 (CI 1.67-25.08) (>1)

NNT - 5
Telemedicine VS Control-Center and VS Control-Hospital

Telemedicine
Reliable factor for reaching of the good outcomes and decrease level of the bad outcomes

Bad outcomes appears more rare

With telemedicine probability of the good outcome is in 2-6.5 times higher
Children (9-16 years) from rural areas with small industries and coal mines

Posture disorders - ~560-625 per 1000

Need urgent surgery – ~2,5-12,5 per 1000

Needs out-patient treatment or continuous medical supervision for the prevention purposes – 60% of all children population!
Scoliosis screening - Adam's Forward Bend Test

Adam’s Test + ICT

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Adam’s Test + ICT

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Design: Prospect diagnostic clinical trial

Compare telemedicine screening with “gold standard” – x-ray examination

Telemedicine screening (by GP)  Gold standard (by radiologist)

Scoliosis+  OR  Scoliosis−
TELEMEDICINE SCREENING OF POSTURE DISORDERS

Sensitivity - 65.8%
Specificity – 87.5%
Diagnostic accuracy – 71.0%
Area under curve (AUC) - 0.83
(95%CI 0.69-0.93)
Positive Likelihood ratio - 5.26
(95%CI 0.83-33.4)
Negative Likelihood ratio - 0.39
(95%CI 0.23-0.65)
Positive predictive value - 96.15
(95%CI 80.3-99.36)
Negative predictive value - 35.0
(95%CI 15.45-59.21)
Kappa – 0.34 – not valid

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<table>
<thead>
<tr>
<th></th>
<th>Telemedicine Screening</th>
<th>Adams Test</th>
<th>Scoliometer</th>
<th>Moire Topography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity, %</td>
<td>65,8</td>
<td>73,9[^{5}]</td>
<td>90,62[^{3}]</td>
<td>100,0[^{3}]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>84,37[^{3}]</td>
<td>83,0[^{2}]</td>
<td>76,6[^{4}]</td>
</tr>
<tr>
<td>Specificity, %</td>
<td>87,5</td>
<td>77,8[^{5}]</td>
<td>79,76[^{3}]</td>
<td>85,38[^{3}]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93,44[^{3}]</td>
<td>99,0[^{2}]</td>
<td>91,0[^{4}]</td>
</tr>
<tr>
<td>Diagnostic accuracy, %</td>
<td>71,0</td>
<td>77,9[^{5}]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Positive/Negative predict</td>
<td>96,15 / 35,0</td>
<td>12,4 / 98,7[^{5}]</td>
<td>0,4-28,3[^{1}]</td>
<td>82,0[^{4}]</td>
</tr>
<tr>
<td>False Positive, %</td>
<td>0,0-2,0</td>
<td>25,0-82,0[^{6}]</td>
<td>50,0-82,0[^{2,6}]</td>
<td>9,96[^{3}]</td>
</tr>
</tbody>
</table>

Telemedicine in traumatology and orthopedics:

- has high diagnostic accuracy
- allows fast correction of diagnosis errors
- mainly good clinical outcomes reported
- decrease risk of the bad outcome
- increase probability of the good outcome
- telescreening of the posture disorders – specific diagnostic test which have to be widely used for continuous medical supervision, especially in rural areas
TELEMEDICINE AND NEWBORNS
Tele-neonatology network

Tele-neonatology – complex utilization of the telemedicine technologies for the planning and providing of the special medical care in neonatal period (0-28 days of life)
Clinical targets...
Management targets...
Features...

- “bring” special care to the patient in rural areas
- fast and effective clinical decision making at primary and secondary levels
- solving problems with staff, knowledge, availability of care
- low-resource, easy-to-use, “any Internet-to-use”

Clinical aspects

Management aspects

Teachnig aspects

Telemedicine consultation
based on simple IP-services and apps

Clinical Telemonitoring

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TELE-NEONATOLOGY NETWORKS in Ukraine

Association for Ukrainian Telemedicine and eHealth Development * ** ***

Donetsk
National Medical University **
Regional Trauma Center * **
Regional Clinical Hospital ***
Municipal Clinical Hospital N6 ***

Kiev
Bogomolets National Medical University ***

Ukraine-Swiss Mother and Child Health Programm *

Kiev, Ivano-Frankivs’k, Luts’k, L’viv, Simferopol’ regions *
Tertiary (regional) and Primary (area) hospitals, R&D Institute, University clinic

Industry partner – “UTAS Company” ***

International Partners – EU, Russia, USA * **

* iPath based tele-network
** e-mail based tele-network
*** Tele-ECG network
Asynchronous telemedicine consultations

Synchronous telemedicine consultations

Tele-ECG consultations (clinical telemonitoring)
Teleconsultations in rural hospitals allows to:

- prenatal teleconsultations with tertiary level centers
- dynamic supervision via regular teleconsultations
- preventive care for the infants with low weight
- eRegistry for the infants with congenital abnormalities
- telediagnosis
Indications for teleconsultations in rural hospitals:

- problems with diagnosis
- complications, bad disease flow
- non-effective treatment
- background for the invasive actions
- atypical, rare clinical case
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Teleconsultations via e-mail

Electronic medical records

Case history .doc, .rtf

short case histories

Diagnostic visualization .jpeg, .tiff

digital x-rays, CT, MRI
digital pictures, echograms

SAFETY:
Inform consent and anonymity

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1-4 experts (from Ukraine, EU and Russia) per each clinical case

Questions

Recommendations

All recommendations has positive influence at the clinical strategy
Welcome to the Ukrainian iPath Telemedicine Server supported by Association for Ukrainian Telemedicine & eHealth Development and Ukrainian Swiss Mother and Child Health Program

The Ukraine telemedicine platform has been designed to foster information exchange and communication between professionals working in the health sector with the following functionalities:

- Create discussion groups related to health topics. Currently there are groups in the filed of Perinatology, Trauma Surgery, Tele-cardiology, etc. allocated on the platform. Within each discussion group the group members can:
  - present and discuss cases (medical or others) in order to exchange information and expert opinions
  - organise consultation services where group members present cases to colleagues who provide their expertise as a second opinion
- Use the telemedicine platform as a Content Management System to collect, store and retrieve various type of documents in a virtual library within the fields of interest of the discussion groups
- Use the telemedicine platform for teaching and training purposes in the domain of health or health sector related occupations through distant presentations, case based learning, downloadable materials, etc.

All interested professionals and institutions are most welcome to use the services provided by the Ukraine telemedicine platform for their own benefit and create their own discussion groups.

iPath is an Open Source Telemedicine Solution and the program code is freely available on sourceforge.net for download. For more information about the iPath project you may visit ipath.ch.

The Ukraine Swiss Mother and Child Health Program is jointly financed by Ministry of Health of Ukraine and Swiss Agency for Development and Cooperation.

In case of questions or if you would like to operate your own discussion group on iPath, please contact the system administrator Anton Vladzymyrsyy the President of the Association for Ukrainian Telemedicine & eHealth Development (AUTFeHD).

news

Наказ МОЗ "Про впровадження телемедицини в закладах охорони здоров'я"

В Україні завершена офіційна нормативно-правова база для використання телемедицини. Міністерство охорони здоров'я України видало наказ "Про впровадження телемедицини в закладах охорони здоров'я" (№ 261 від 26.03.2010). В основі нормативно-підготовчих робіт лежить рекомендація ОПАР английської асоціації "Організація телемедичних зв'язків та електронної охорони здоров'я" (Telemedicine and eHealth Association for Ireland and Europe), а також рекомендації Комітету з діяльності центра телемедичних центрів та Інституту стратегічних досліджень МОЗ України. Подроби...

http://www.telemed.org.ua/pages/andreoz/resource.html
### Clinical cases list

<table>
<thead>
<tr>
<th>ID</th>
<th>Вид</th>
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<td>М</td>
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<td>case</td>
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**Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011**
Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
- regions with staged system
- external experts (national and international)
Ivano-Frankivsk, Vinnytsia, Volyn, Crimea - regions with staged system

Tertiary perinatology hospital (regional)

External experts (national, international)

Area hospital (rural)

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Teleconsultations with external experts

Female, 12 days. Femur hypoplasia, congenital hip dislocation

Asynchronous teleconsultations via iPath between Volyn and Donetsk for determination of the terms and stages of the surgical treatment
Teleconsultations with external experts

Male, 14 days
Congenital ichthyosis

Asynchronous teleconsultations via iPath between Volyn, Donetsk and Graz (Austria) for determination of the treatment strategy

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
35% of the teleconsultations made by international experts from EU.
Extremely important thing:

evidence-based opinions and recommendations
(teleconsultations with clinical examples, randomized trials etc)
Synchronous telemedicine consultations

TOOLS

Desktop videoconference

Web-platform + SMS-alert
2 days old boy with femur fracture

RESULTS AFTER TELECONSULTATION:
No unnecessary and dangerous transportation
Non-surgical treatment
Excellent outcome
Female, 10 days
Thermal burn of the head and arm (with scull bones charring)

Asynchronous teleconsultations via iPath between Volyn and Donetsk for the treatment strategy

Child was immediately transported to the National Children Burn Center

CITO cases without alerting – prolongation!
Web-platform + SMS alert
Realtime teleconsultation in-progress

Expert's first answer after 19 min.
Special steps for the urgent teleconsultations organisation have to be done!!!

- more comprehensive management of the experts’ duties and reactions

- desktop videoconferences as obligatory part/tool of telemedicine web-platforms
1 newborn from each 5 has clinical and ECG-sign of the cardiology pathology...

40-70% of infants after perinatal hypoxia has cardiology pathology...

Rate of heart congenital abnormalities - 3-10 per 1000 newborns...

Terrible ecology...

Tele-ECG consultations
Tele-Echocardiography

Telemonitoring
Su F. et al, 2002,
Qi H. et al, 2002,
Pan J. et al, 2002,
Löfgren N. et al, 2003,
Kerner R. et al, 2004,
Di Lieto A. et al, 2006,
Barratt C. et al, 2007

EXPERT
Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Cardiology Diagnosis

- Echocardiography
- Tele-Echocardiography
- ECG
  - Expensive, no-peopleware, technical problems
  - No-peopleware
  - TELE-ECG

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Tele-ECG for the infants in Neonatal ICU

Indications for the tele-ECG teleconsultations in neonatology ICU

- perinatal or intranatal asphyxia or hypoxia
- prenatal pneumonia
- congenital abnormalities suspicion
- clinical signs of cardiovascular pathology (cyanosis, heart murmurs etc)
- monitoring of the medication therapy (dopamin) efficiency
Regional Hospital

University Clinic

Neonatal ICU

3G data transmission

Duration of the tele-ECG consultations - 10-15 min

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Expert Center – Cardiology Dep. of Regional Clinical Hospital

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Teleconsultation on progress...
ECG Interpretation

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Results of the tele-ECG consultations

- Changes found at ECG - 73%
- Objective verification of the clinical diagnosis – 100%
- Fast correction of the medication therapy - 36.4%
- Real background for calling of cardiosurgeon
- Average in-hospital stay - 10.5±6.1 days
- Good clinical outcomes - 90.9%
Conclusions

Tele-neonatology – is a fast growing area of the telemedicine. It is become obligatory part of the national health care system.

Experience with tele-neonatology in Ukraine are very positive and promissive.

Telemedicine network which had been organized allows to solve clinical and teaching problems.
When you have serious health problem – it’s good to have “second opinion”
Multidisciplinary Regional Telemedicine Network

Collaboration of

Dnepropetrovsk Regional Health Care Administration

Association for Ukrainian Telemedicine and eHealth Development

Dnepropetrovsk Regional Clinical Hospital named after Mechnikov

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Videoconferences: learning for the telemedicine theory and skills

Targets and infrastructure evaluation...

Project of the Network...

Funding and organisation issues...

Learning for telemedicine
- managers
- physicians, GPs
- nurses

Start!
Dnepropetrovsk regional telemedicine network

- Regional Hospital (III)
- Central Area Hospitals (II)
  - Area Hospitals (I-II)
- Municipal Hospitals (II)
- GP ambulatories (I)
Easy-resource telemedicine:

1. Working station:
   - PC
   - Digital photocamera
   - Web-camera

2. Internet

3. Documentation and guidelines
Synchronous telemedicine consultations

Clinical case docs via e-mail

Expert thinking

Videoconference

Documentation (recommendations) via e-mail

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Pathologies discussed during telemedicine consultations

Telemedicine Workshop at the Institute of Tropical Medicine in Antwerp 28-30 September 2011
Diagnostic efficiency

Number of experts – 1-5 per each case

Agreement of recommendations in experts’ teams - 100%
(ex. cardiologist+radiologist)

Agreement between primary diagnosis and experts’ diagnosis:
Kappa - 0,026 (95% CI 0,025-0,077)

During telemedicine consultations primary diagnosis were changed in 48,0% cases
Table 1. Scale for objective judgment of teleconsultation’s relevance

<table>
<thead>
<tr>
<th>1. Terms. Teleconsultation is lead:</th>
<th></th>
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<tbody>
<tr>
<td>Before the necessary terms</td>
<td>3</td>
</tr>
<tr>
<td>In the necessary terms</td>
<td>3</td>
</tr>
<tr>
<td>After necessary terms</td>
<td>2</td>
</tr>
<tr>
<td>In terms of full loss of the urgency</td>
<td>1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Conformity of answers:</th>
<th></th>
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<tbody>
<tr>
<td>Full conformity</td>
<td>3</td>
</tr>
<tr>
<td>Incomplete conformity of answers to questions, illegibility of formulations and recommendations</td>
<td>2</td>
</tr>
<tr>
<td>Discrepancy of answers to questions</td>
<td>1</td>
</tr>
</tbody>
</table>

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<tr>
<th>3. Presence of additional confirming information (articles, links, references, similar clinical cases etc), evidence-based recommendations:</th>
</tr>
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<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
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<tr>
<th>4. Influence on the clinical tactics:</th>
</tr>
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<tbody>
<tr>
<td>Tactics of the adviser is completely accepted</td>
</tr>
<tr>
<td>Essential change of own tactics</td>
</tr>
<tr>
<td>Acknowledgement of own tactics</td>
</tr>
<tr>
<td>Refusal of adviser’s recommendations</td>
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</tbody>
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<tr>
<th>5. Inquiry for additional diagnostic tests:</th>
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<tbody>
<tr>
<td>Not accessible tests</td>
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<tr>
<td>Accessible tests with an investment of significant expenses (work, money)</td>
</tr>
<tr>
<td>Inaccessible tests</td>
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<tr>
<th>6. Expert has propose:</th>
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<tbody>
<tr>
<td>One clinical program</td>
</tr>
<tr>
<td>A few clinical programs</td>
</tr>
<tr>
<td>Preconditions for formation of the program</td>
</tr>
</tbody>
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<tr>
<th>7. A few distant experts take a part:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
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</table>

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<tr>
<th>8. Transportation after teleconsultation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>
Management efficiency

- Treatment in local hospital: 58%
- Transportation and treatment in referral center: 23%
- Diagnostic examination (90% - CT) in referral center, then treatment in local hospital: 19%

Diseases:
- Cardiology: 25%
- Urology: 6%
- Neurology: 25%
- Oncology: 6%
- Orthopedics: 38%
- Careful elaboration

- “Easy”-resource telemedicine according to local targets and features

- Special learning for telemedicine theory and skills

- Standards for the process and documentation

- An effective regional multidisciplinary telemedicine network
TELEMEDICINE AT NATIONAL LEVEL
2009 – Memorandum between Ministry of Health Care, Company MTS and UN

2010 – Start of telemedicine activity
National Telemedicine Network of MHS

Better availability of the special care for any citizen

Fast connection between largest hospitals, regional health care administrations and MHS

- VPN and fiber-optic lines (from the largest national mobile operator)
- Hardware videoconferences
- Electronic health records
National Telemedicine Network of MHS (2010-2011)
THANK YOU VERY MUCH!

Welcome to Donetsk for EURO-2012!

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