Telecare in Peritoneal Dialysis from the eLearning Perspective

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peritoneal dialysis

- one of the basic treatments for patients with end stage renal disease (ESRD)
  - artificial kidney (haemodialysis)
  - peritoneal dialysis
  - renal transplant

- implemented at patients’ home and allows
  - continuity of personal and professional activities
  - mobility (vacation, travel, etc)
  - better & regular nutrition
  - better results in future renal transplant
end stage renal disease frequency

The diagram shows the rate per million population for end stage renal disease frequency in various countries. The countries are ranked from highest to lowest frequency, with the United States and Mexico having the highest rates, followed by Japan, and so on. The rates decrease as we move down the list, with Bangladesh showing the lowest frequency.
expected ESRD frequency increase

431,000
treatment for ESRD

1. renal transplantation

2. dialysis: removal of water and body wastes that build up in failing kidneys

- artificial kidney
  - blood cleaning outside the human body via specialized equipment (artificial kidney)
  - performed in a hospital (rarely at home)
  - 4 hours X 3 times per week

- peritoneal dialysis
  - blood cleaning based on fluid exchanges in the peritoneal cavity
  - performed at patient’s home, throughout the day/night
peritoneal dialysis

- A dialysis fluid is inserted in the peritoneal cavity, after a period of time becomes saturated with waste and then it is exchanged with new fluid.
  - \(~4\) exchanges per day
    - (or a number of exchanges during the night)
  - Requires a catheter in the peritoneal cavity & a special mobile unit for fluid exchange
  - Performed at patient’s home
  - \(~1\) scheduled hospital visit per month
peritoneal dialysis

CAPD - continuous ambulatory peritoneal dialysis

APD - automated peritoneal dialysis
peritoneal dialysis

- effectiveness of the method depends among else on the specific dialysis scheme, which depends on:
  - patient’s weight changes
  - type and amount of fluid inserted and exerted
  - blood pressure, heart rate, (ECG, blood glucose, ...)

- easy to implement – difficult to deal with complications

- declining in some countries, increasing in others

- 10–30 % of dialysis patients internationally
dialysis patients by treatment method

USRDS 2004

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being performed solely at home, peritoneal dialysis is a unique candidate for support via telematic services

- psychological support of patient via teleconferencing
- patient re-training
- evaluation of catheter exit site and oedema presence
- telemetry of vital sign and PD parameters that affect the effectiveness of the method
- cycler monitoring and (possibly) intervention to change prescription
current status

- Germany: videoconferencing for CAPD
  - patient consulting & psychological support
- Spain: videoconferencing to substitute visit to clinic
  - patient consulting, catheter exit examination
- Japan & Italy: videoconferencing & telemetry
- Fresenious (http://www.fmc-ag.com/) & Baxter (http://www.baxter.com/)
  - certain APD models include ability for cycler data telemetry
current status

Baxter & Fresenious

- automatic telemetry of cycler data
- via a disk (offline) and/or via modem (online)
- include server application for patient data monitoring
- available only for certain APD cycler models
- provider specific - not standard based or interoperable
telecare for peritoneal dialysis

- useful in detecting and solving technical problems
- low cost
- easy to incorporate in clinic/patient daily routine
- saves hospital time and load
- satisfactory for patient - generally improves QoL

however

design considerations and technical limitations in existing solutions prohibit widespread use !!!!
requirements (not currently met)

- telemetry of any parameter: biometric, vital sign, PD scheme specifics, cycler data,
- support of both CAPD and APD
- support various types of communication (mobile telephony, data network, standard telephony, etc)
- modular design, based on standards (generic middleware standards to allow interoperability among third party providers)
PERKA: Telecare for Peritoneal Dialysis

- competitive R&D grant funded by the
  - Regional Operational Programme, East Macedonia and Thrace, Ministry of Development, Greece
  - European Regional Development Fund

- project specifics
  - duration: 2006-2008
  - budget: 640,000 €
  - Scientific Coordinator: Prof. V. Vargemezis, DUTH
  - Partners: Alpha (www.alphait.gr)
    Vidavo (www.vidavo.gr)
    Exedron (www.exedron.com) subcontractor
supporting APD & CAPD

- patient telemonitoring
- intelligent alarms
- archiving, processing and management of patient telemetric data
- statistics and data mining

telemetry of

- peritoneal dialysis schema data
- patient weight
- blood pressure
- heart rate
- ...

other clinical information systems
PERKA

PERKA Data Center

- Patient data
- Administrative & portal data

Data collection & data processing Web Service

PERKA portal

Internet

telemetry data

XML/SOAP

HTTPS

Patient Unit

Medical devices

Patient

Medical personnel
server application - patient data
server application - measurement definition
server application - measurement definition
server application - PD prescription
server application - telemetry data view
patient unit - PDA
patient unit - PC
patient unit - PC

- Download Configuration Success
- Download Measurements Success

Πέμπτη 28 Αυγούστου 2008
06:00

Μέτρηση: Βάρος Σώματος

Kilogramms

98, 500

Ανεβέίτε στην ζυγαριά και εισάγετε το βάρος σας.
PERKA

PERKA Data Center

Patient data

data collection & data processing Web Service

Internet

telemetry data

XML/SOAP

HTTPS

Patient Unit

medical devices

PERKA portal

administrative & portal data

HTTPS

HTTPS

medical personnel

patient
PERKA portal

- a unique opportunity for education
- for patients
- for patients’ families
- for the public
- for medical personnel
the e-learning perspective

- for patients
  - medical record related information
  - support groups
  - re-training (PBL based 'troubleshooting')

- for families
  - how to support the patient
  - support groups
  - re-training (PBL based 'troubleshooting')

- for the public
  - information on how to avoid end stage renal disease
  - early symptoms
the e-learning perspective

- for the medical personnel
  - basic medical doctor training;
    link to information material, teaching file collection, and web 2.0 PBL for peritoneal dialysis, for
  - work on real patient episodes (anonymized) as recorded by the systems to build didactic problems to train doctors and especially nurses to care for patients and efficiently resolve their problems
http://www.perka.gr/

work funded under the R&D grant

“PERKA: Telecare Service for Peritoneal Dialysis”

Regional Operational Programme, East Macedonia and Thrace, Ministry of Development, Greece

European Regional Development Fund
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