Clinical decision support based on practice guidelines: a business case on prostate cancer treatment
Prostate Cancer: new challenges to face

- Prostate cancer (PCa) is now the most common cancer in men in Europe with a dramatic increase in incidence rates whereas mortality is globally decreasing.

- Tremendous progress has been made in the last decade in the treatment of prostate cancer (from surgical interventions to radiotherapy, hormone-therapy, chemotherapy, vaccination and even prevention). Now research is more focused on biology or genomics.

- Monitoring PCa is now evolving and a new management is to be implemented. Routine PSA screening is no more recommended due to over-diagnosis and overtreatment. Nomograms and guidelines are needed to help physicians for a better management of patient’s disease.
Nomograms and guidelines: what for?

- **Nomograms** are tools to predict the risk of PCa on biopsy and its potential for progression.

- They need to integrate constantly new features to be as precise as possible.

- **Guidelines** are established to help physicians in their choice of treatment or options. There are many guidelines on PCa, and in Europe the EAU edits their own guidelines which are updated on a regular basis.

- Are those tools helpful for physicians and what about patients? A recent survey has demonstrated that nomograms are not really used in daily practice and that guidelines, even if approximately known, are not regularly consulted. Nevertheless, **individualized treatment in PCa is strongly recommended** and a way to display and analyze simultaneously all important patient parameters is to create a computer-based online tool.
A new tool to individualize patient treatment / care

- The 2011 EAU Guidelines include chapters on: diagnosis and staging, radical prostatectomy, primary treatment, hormonal therapy, follow-up after treatment with curative intent, follow-up after hormonal treatment, second-line therapy after treatment with curative intent as well as recommendations for each clinical situation that might be encountered in PCa management.

- The information is vast
- The number of rules is huge

- The problem is really complex: lots of situations, critical data, inconsistencies
A digital tool for daily practice: “Uro Digital Guidance®”

- In collaboration with EAU and AFU (Association Française d'Urologie), and financed by Ipsen, Normind has developed a new computer-based tool, available at first in English: the “Uro Digital Guidance®” tool.

- Goal: improve the standard of care in PCa management, by giving unbiased information that will be updated regularly

- The tool displays integrated Guidelines: provides a straightforward access to the guidelines and recommendations

- A selection of nomograms is included

- « It really is innovative and different from other tools in the selection and structure of data collection, as well as in the selection of the various platforms used. This is the first version of a tool that is built to be adaptable in view of the positive and negative feedbacks from the physicians »
Support to therapeutic management and monitoring

The challenge for urologists is to raise the level of care for patients through best practice guidelines issued by the EAU. This software uses in real time the data provided during the consultation (history, clinical data, tumor staging, etc.) and supports therapeutic decision-making and preparation of reports for consultation based on the EAU guidelines. The comparison of clinical practice with the EAU guidelines will help the MDT (Multidisciplinary team) plan treatment specific to individual needs ensuring all necessary investigations are carried out as quickly as possible. This comparison occurs in the software panels through colored items:

Answer or value to give:
Answer or value required by the guidelines.

Recommendation:
Value or data recommended by the guidelines and used by the tool. You can disagree and choose another value or data.

Contra-indication:
Value or data contra-indicated by the guidelines and used as it by the tool. You can disagree and choose another value or data.

Divergent views:
You disagree with the guidelines. This is only for information. The tool will still help you differentiate between the guidelines and YOUR choices.

This is a valid exploitation copy expires on 31/03/2012

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The whole picture

Guidelines update

Euro Digital Guidance in routine usage

Practice Assessment

Data collection
Why is it difficult?

- The domain is huge
  - ~750 terms
  - ~1500 rules

- Explanation is key for usage by physicians. They have to understand why the tool is providing an information and where are the source of the rules in the guidelines

- You can’t define any kind of constraint in the decision process

- There are inconsistancies into official guidelines
- Some parts need interpretation from the physicians, several options are possible

- The guidelines are updated annually
Decision Tree: what’s make the different with Intègre®

- Decision Trees imposes logical path with a unique entrance
- Intègre® goes beyond alternative existing systems’ constraints, allowing to enter and to exit from any object of the tree, linking each of them with rules, detecting incoherencies and deducing new possible exits, even with missing data.
Decision support for therapeutic treatment selection

Referential Use

recommendations

+ 

referentials

With minimal data required

Split in categories:
- Scientific organization
- Network
- ...

Possible classified through a specific hierarchy (?)

Consultation notes writing, based on best practice in order to produce a decision

Shared cancer file

Shared medical folder

Clinical data

Notes

Filing

Discussion process
Quality assessment

- Collected data quality
- Real practice and referential gaps
- Completeness of minimal required data
- Practice adequation / recommendations
- Collective and personal monitoring dashboards

- Impact analysis
- Update (new facts)
- Weak points detection
  - Proposals never applied
  - Rules never used
  - Variables correction’ s proposals
## Practice assessment

<table>
<thead>
<tr>
<th>Règle</th>
<th>%violation</th>
<th>%incomplète</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si M1 (métastases), proposer Hormonothérapie.</td>
<td>4.77%</td>
<td>-</td>
</tr>
<tr>
<td>Si age &lt; 75, espérance de vie &gt; 10 ans, PSA &lt;= 15 et gleson &lt;= 7, proposer Surveillance, Prostatectomie, Curiethérapie ou Radiothérapie.</td>
<td>3.67%</td>
<td>-</td>
</tr>
<tr>
<td>Pas de Curiethérapie si le PSA est supérieur à 10.</td>
<td>1.28%</td>
<td>-</td>
</tr>
<tr>
<td>Si gleson &lt;= 5 et age &gt; 65 ans, proposer Surveillance.</td>
<td>1.28%</td>
<td>-</td>
</tr>
<tr>
<td>Si PSA &gt; 20 et gleson &gt; 7, proposer Radiothérapie ou Hormonothérapie.</td>
<td>1.10%</td>
<td>-</td>
</tr>
<tr>
<td>Si gleson &lt;= 5 et PSA &lt; 10, proposer Curiethérapie.</td>
<td>0.92%</td>
<td>-</td>
</tr>
<tr>
<td>Si PSA &gt; 15 et espérance de vie &gt; 10 ans, proposer Surveillance, Hormonothérapie ou Radiothérapie.</td>
<td>0.92%</td>
<td>-</td>
</tr>
<tr>
<td>Si PSA &gt; 20 et gleson &gt; 7, proposer Radiothérapie ou Hormonothérapie.</td>
<td>0.92%</td>
<td>-</td>
</tr>
<tr>
<td>Pour un stade cT4 et un gleson &gt;= 7, on préconise le protocole Getug12.</td>
<td>0.55%</td>
<td>-</td>
</tr>
<tr>
<td>Si pN1, proposer Hormonothérapie ou Chimiothérapie.</td>
<td>0.55%</td>
<td>-</td>
</tr>
<tr>
<td>Si gleson &gt; 7 et stade R1, alors proposer Radiothérapie, Hormonothérapie ou Chimiothérapie.</td>
<td>0.55%</td>
<td>-</td>
</tr>
<tr>
<td>Si Grade &gt; 7 Et N patho. == N1 Alors on recommande Radiothérapie Ou Hormonothérapie Ou Chimiothérapie</td>
<td>0.37%</td>
<td>-</td>
</tr>
<tr>
<td>Si stade clinique T3 Mo, alors on préconise le protocole Getug12.</td>
<td>0.37%</td>
<td>-</td>
</tr>
<tr>
<td>Pas de Curiethérapie si M1 (métastases).</td>
<td>0.37%</td>
<td>-</td>
</tr>
<tr>
<td>Pour un stade pT3-4, R1-2, pN0, on préconise la radiothérapie ou l’hormonothérapie.</td>
<td>0.18%</td>
<td>-</td>
</tr>
<tr>
<td>Pas de surveillance si gleson &lt;= 5 et age &lt;= 65 ans.</td>
<td>0.18%</td>
<td>-</td>
</tr>
<tr>
<td>Pas de Radiothérapie si pT3c.</td>
<td>0.18%</td>
<td>-</td>
</tr>
<tr>
<td>Pour un stade pT3-4, R1-2, pN0, on préconise le protocole Getug12.</td>
<td>0.18%</td>
<td>-</td>
</tr>
<tr>
<td>Pas de Prostatectomie si M1 (métastases).</td>
<td>0.18%</td>
<td>-</td>
</tr>
<tr>
<td>Pas d'HIFU si M1.</td>
<td>0.18%</td>
<td>-</td>
</tr>
<tr>
<td>Pas de Radiothérapie si PSA &gt; 30.</td>
<td>0.18%</td>
<td>-</td>
</tr>
<tr>
<td>Si le grade est renseigné, il est utile de renseigner le grade secondaire.</td>
<td>39.63%</td>
<td>-</td>
</tr>
<tr>
<td>Si le grade est renseigné, il est utile de renseigner le grade primaire.</td>
<td>39.63%</td>
<td>-</td>
</tr>
<tr>
<td>Si on sort du consensus, il est préférable de commenter son choix.</td>
<td>18.72%</td>
<td>-</td>
</tr>
</tbody>
</table>
Next steps and other subjects

- Perspectives on UroDigitalGuidance Application
  - Kidney cancer guidelines
  - Clinical studies

- Other available applications
  - Asthma
  - Hypertension
  - Bladder cancer treatment by BCG Therapy

- Other perspectives, next applications
  - Diabetes guidelines modelisation
  - Selecting the right medical imaging examination
  - Cardiology
  - Impaired renal function