Global Impact of a Clinical Informatics System

Scalable delivery of on-time access to evidence-based multidisciplinary expert treatment decisions for all cancers

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On behalf of the National Cancer Grid of India
a network of 108 member institutes
My objectives today are to suggest that…

• Cancer moonshots are great, but unlikely to tackle the growing burden of cancer globally
• Cancer burden will substantially reduce by making optimal use of strategies available today
• Health services initiatives have a crucial role
• Cancer earthshots’ over moonshots!
Projected burden of cancer in India

Current incidence: 1 million
Incidence in 2035: 1.7 million

Mallath et al.
Lancet Oncol 2014
Inequitable access to healthcare

Mallath et al.
Lancet Oncol 2014
Distribution of patients visiting Metropolitan based cancer centers like Tata Memorial Centre, for example

Courtesy Swasth India
Tata Memorial Centre and National Cancer Grid and Navya bring you evidence based expert treatment decisions.

Get an expert opinion in 1 to 3 days from Asia's largest leading expert cancer centers.

Navya has accurately made over 5000 expert treatment decisions in oncology.
Navya Online Expert Opinion Service for patients

- Right of access to the best minds in cancer - anyone can go online, anytime
- Low cost concierge service helps patients clarify decision questions in 24 hours
- Consensus multidisciplinary tumor board decisions in layman terms
- Navya mobile ExpertApp for physicians
  - Systematic decision support
  - Structured case data, patient-specific options based on literature & experiential knowledge
  - Rapid review on smartphones
  - Multidisciplinary collaboration online, generating experiential knowledge-base
Family Hist:
- Mobile No Clear
- Small gland
- Irregular hard nodular
- Men under 50
- No skin change
- No deepa from

Presented by: C S Pramesh
<table>
<thead>
<tr>
<th>Clinical Diagnosis</th>
<th>Locally Advanced Breast Cancer (LABC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical TNM Stage</td>
<td>Stage IIIC - T3 N3 M0</td>
</tr>
<tr>
<td>Desires BCT</td>
<td>Yes</td>
</tr>
<tr>
<td>Breast Cancer Laterality</td>
<td>Left</td>
</tr>
<tr>
<td>Upper Outer Quadrant</td>
<td>Yes</td>
</tr>
<tr>
<td>Central</td>
<td>Yes</td>
</tr>
<tr>
<td>Initial Clinical Tumor Size (cm) Dimension 1</td>
<td>10.00</td>
</tr>
<tr>
<td>Initial Clinical Tumor Size (cm) Dimension 2</td>
<td>9.00</td>
</tr>
<tr>
<td></td>
<td>NACT OPTIONS FROM THE EVIDENCE AND GUIDELINES ENGINES</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>AC-&gt;D: A(60)/C(600)q3w→→D(100)q3w*4</td>
</tr>
<tr>
<td>2</td>
<td>ddAC-&gt;Pw: A(60)/C(600)q2w<em>4→P(80)qw</em>12/GCSF</td>
</tr>
<tr>
<td>3</td>
<td>TAC: A(50)/C(500)D(75)q3w*6/GCSF</td>
</tr>
<tr>
<td>4</td>
<td>AC-&gt;Pw: A(60)/C(600)q3w<em>4→P(80)qw</em>12</td>
</tr>
</tbody>
</table>

Comments

5

Submit Opinion

Alternatively please login to Navya system and upload your recommendation click [here](#).
Navya Expert system – SABCS 2014

98% concordance between system output decisions and tumor boards
Navya Expert system – ASCO 2016: Decision concordance

I. Online Expert Opinion - India (161 patients)

<table>
<thead>
<tr>
<th>Major</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>275</td>
<td>221</td>
</tr>
<tr>
<td>100% [99.9%-100%]</td>
<td>100% [99.9%-100%]</td>
</tr>
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</table>

II. Tumor Board - USA (145 patients)

<table>
<thead>
<tr>
<th>Major</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>450</td>
<td>439</td>
</tr>
<tr>
<td>98% [97.98%-98.01%]</td>
<td>97.26% [97.25%-97.28%]</td>
</tr>
</tbody>
</table>

97% concordance between system output decisions and online experts
How it Works

Step 1
- Clarifications between Analyst & Patient
  - PATIENT PREFERENCES
  - RESOURCE CONSTRAINTS

Step 2
- PATIENT-SPECIFIC SEARCH
  - NAVYA ANALYST
    - STRUCTURED DATA
    - PATIENT PREFERENCES
    - RESOURCE CONSTRAINTS
  - PATIENT
    - UNSTRUCTURED DATA

Step 3
- Clarifications & Follow-ups
  - Machine learning updates Experience Engine
  - NAVYA ANALYST
    - STRUCTURED DATA ADEQUACY
    - QUALITY
  - EXPERT APP
    - STRUCTURED CASE SUMMARY
    - TREATMENT RECOMMENDATION
  - PATIENT REPORT
  - PATIENT
    - VETTED TREATMENT RECOMMENDATION
    - CONSENSUS RECOMMENDATION

Presented by:
Rationale for the study

• Concordance between best evidence, guidelines and real-world decisions established

• Real impact would depend upon
  – Whether patients shared the Navya decision with their treating physicians / oncologists
  – How often the Navya decision was followed for patients
Methods

• Prospective impact assessment
• Patients who received an expert opinion report between July 2016 and March 2017
• Phone follow-up asking the following questions:
  1. If the Expert Opinion Report was shared with treating provider
  2. If the treatments received was the TMC NCG Navya’s treatment recommendation

Presented by: C S Pramesh
Results

• 10,779 patients from 47 countries (22 developing) registered
• 3284 patients received simple language reports
• 5861 patients received system-generated evidence and experience-based information
• 24 hours median turnaround time
Results

• Total number of patients 914
• Response rate 90%
• Sample size 824 patients

• # of Rx decisions: 1086 decisions for 824 patients (11% decisions unknown for Rx received)
Results

- 72.3% [CI 3.05%] of patients shared the Expert Opinion Reports with their treating oncologists
Results

• 78% [CI 2.95%] of Navya treatment decisions were the final treatments received by patients

• Common reasons for non-implementation of Navya decision:
  – ECOG PS, Organ Function, Resource Constraints
Discussion

• Patients are comfortable with informed decision-making with treating physician / oncologist
• Received evidence-based Rx

• Treatment decisions suggested by the Navya system are followed by the majority of patients seeking it
Working model of clinical informatics and healthcare services

- Navya provides multidisciplinary evidence based expert opinions online within 24 hours to thousands of patients across 57 countries
- Navya can help maximize outcomes for patients without ready access to expertise
Health informatics directly impacts patient health outcomes on global scale

- Standardize evidence based quality metrics for care
- Learn from experience across expert centers, globally
- Consider patient-preferences and constraints, increases compliance
Conclusions

• Clinical informatics solutions can be meaningful aids in cancer care
• Timely expert second opinions are feasible at scale
• Informatics-based expert opinions impact cancer treatment in a real-world scenario
• Potential to transform cancer care provision in underserved areas globally