CHANGING THE USE OF AUTOANTIBODY TESTING: AN APPROACH TO PREVENTION OF AUTOIMMUNE DISEASES

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**CHECK AGAINST DELIVERY

Disclosure

Dr. Marvin Fritzler is or has been a consultant to, and/or received gifts in kind from, Inova Diagnostics Inc., Werfen Diagnostic Solutions, BioRad, Euroimmun GmbH, Mikrogen GmbH, Dr. Foeke Laboratorien GmbH, ImmunoConcepts, GSK Canada, Amgen, Roche, Astra Zeneca and Pfizer.

He is the Director of Mitogen Advanced Diagnostics Laboratory.

OUTLINE

- There are compelling reasons to shift our focus to an earlier and accurate diagnosis (CASE FINDING) - leading to PREVENTION of systemic autoimmune rheumatic diseases (SARD).
- Evidence-based approaches to interventions for “incomplete, very early” or “pre-clinical” SARD are emerging. Disease PREVENTION is an emerging paradigm.
- Since autoantibodies are unique among biomarkers, an evidence-based approach to autoantibody screening and case finding is needed (i.e. “actionable biomarkers”).
- There is a “value proposition” to consider
What do we know?

Trends in health expenditures are unsustainable

Health Care Expenditures

USA 2015
- $3.2 trillion = $9,990 per person
- ~19% of GDP

CANADA 2016
- ~$228 Billion = $6,229 per person
- 11% of GDP
- Rate of growth 1.5% (decreased hospital and pharmaceutical spending)

EURO 2014
- ~33 Billion Euro = 5700 Euro ($5009 USD) per person
- 11.8% of GDP (OECD average 9.3%)
- Rate of growth 3.5%; pharmaceutical spending is decreasing.

We know?

SARD
(SLE, SSc, MCTD, AIM, SjS)
are exemplified by heterogenous clinical and pathological phenotypes
SLE – a variety of signs & symptoms...

SSc – a spectrum of signs & symptoms...

And we know that:

ADVANCED DISEASE is often present at the time of diagnosis

- ~30% of SLICC SLE had renal disease at enrollment*
- 15-25% go on to end stage renal failure
- ~25% of SSc - evidence of ILD or PHT within 3 months of diagnosis**

** Dr. Marie Hudson: Canadian Scleroderma Research Group (CSRG)
We know that:

Increased Health Care Expenditures on SARD are highly correlated with advanced disease

<table>
<thead>
<tr>
<th>SLE</th>
<th>HCE/pt/yr.</th>
<th>∆$/pt/yr.</th>
<th>Average HCE/yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Nephritis</td>
<td>$5,347</td>
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<tr>
<td>Nephritis</td>
<td>$33,472</td>
<td>$28,125</td>
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<td>Non-Active</td>
<td>$4,646</td>
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<td>NPSLE</td>
<td>$30,341</td>
<td>$25,000</td>
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<table>
<thead>
<tr>
<th>SSc</th>
<th>HCE/pt/yr.</th>
<th>∆$/pt/yr.</th>
<th>Average HCE/yr.</th>
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</thead>
<tbody>
<tr>
<td>Diffuse</td>
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<tr>
<td>Limited</td>
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<td>$4,700</td>
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<tr>
<td>General</td>
<td>$8,713</td>
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</table>

Estimated Annual Hospitalization with Dx SLE or SSc USA: ~100,000 @ $30,000 = $3 Billion

Autologous Hematopoietic Stem Cell Transplant (AHSCT) for SSc
Bone Marrow Transplant

Cost of AHSCT in SSc:
• $75,000 in Canada
• $150,000 in USA

Majority of HC Expenditures SARD (USA)

• Ambulatory visits
• Specialist visits
  • ER visits & revisits
  • In-patient hospital & readmissions

$5,000 $30,000

• Can we move the range of HCE to the left...PREVENTION of disease?

We know that:
The key to early diagnosis and disease PREVENTION is “CASE FINDING”
If we wait until the patient fulfills SARD criteria, it is too late.

Oops...too late!!

Mass Screening for Neuroblastoma


Value of Biomarkers in the Prevention of Rheumatoid Arthritis

9 variables

autoantibodies
We know that:
Certain autoantibodies and other biomarkers antedate full blown, ‘classification criteria eligible’, clinically diagnosed disease

TIME COURSE SSc

CONTEMPORARY MEDICINE: INTENT TO TREAT

FUTURE MEDICINE: INTENT TO PREVENT

Autoantibodies: increase in number, titer, epitope spreading and other characteristics.

Filling in gaps of early Dx of SARD

• Evolution of undifferentiated connective tissue disease
  • Only ~30% (range 5-32%) evolve
  • of those who evolve, majority (>80%) develop SLE
  • <20% evolve to SjS, RA, SSc, MCTD, AIM
• SOME PREDICTORS and TIME LINES ARE KNOWN BUT LONGITUDINAL STUDIES OF MULTI-CENTER UCTD/
  Very Early SSc are required

We know that:
PREVENTION strategies are ACTIONABLE

Stages in SLE & Predictive Biomarkers

Clinical Care Pathway Pre-Clinical SLE


Clinical Pathway Early SSc

But…will all of this investigation cost more money?

Cost of Outpatient Diagnostics:
Barely on the “Richter Scale”

http://www.healthinsurance-forhumans.com/health-economics.html
Annual Expenditures on In Vitro Diagnostics (IVD)

Annual HCE IVD: USA 2.3%
Germany 1.45%

81% OF PHYSICIANS BELIEVE: >5%

SARD: Diagnostic Testing, Case Finding and Intent to Prevent
A VALUE PROPOSITION

* Value = OUTCOMES/COST

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McGill University
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Acknowledgements

Don’t forget the kids!!