

Integration Goals for Pathology: An Intra- and Inter- Specialty Agenda

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Defining dx convergence & integration; why desirable goals

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- Will use convergence/integration synonymously in lecture
- Goal: achieve more value/efficiency within pathology/labs
- Integration requires more efficient & effective workflow
- Integration results in fewer hand-offs by professionals
- This yields “better, cheaper, faster” care delivery for patients
- Faster, cheaper, better inevitably => higher quality care

Avoiding the use of word “merger” although may be appropriate

- I tend to avoid use of word “merger” in these discussions
- Generally too provocative a term; too many sacred cows
- However, term relevant regarding pathology ⇔ radiology
- Will discuss later product this merger: *diagnostic medicine*
- Final goal, for me, is to place specialties under one umbrella
- This will *never* happen quickly; result of incremental change

Digging deeper for meaning of “better, cheaper, faster”

- All of the words in the phrase are self-explanatory/oblivious
- Better and faster not contradictory; discard wasted steps
- This enables more attention to professional competence
- Today’s new challenges: hollowing out of the middle class
- Emerging picture: two hospital queues – wealthy & strapped
- Increasingly, we need to deliver more cost-effective dx care



Opportunities for convergence
under consideration in lecture

Opportunities for convergence within pathology: first, AP and CP

- Roots of anatomic pathology lie in previous centuries
- Clinical pathology developed largely post-World War II
- CP turfed to pathologists by default because hospital-based
- CP became financially lucrative in 70's; began to end in 00's
- Pathologists reimbursed on percentage of lab gross revenue
- Most such contracts now gone; return to focus on surg path

Growth of molecular pathology; why need to break down silos

- Molecular testing provides more specificity to diagnoses
- Open doors to enhanced predictive/preventive medicine
- Emergence of multiplexed tests with computer algorithms
- Even greater “power” for surgical pathology diagnoses
- Barrier to AP/CP convergence => multiple silos in pathology
- IT enables integration with “dashboards” to legacy systems

Fractionation/segmentation has also occurred in other specialties

- Fractionation/segmentation not unique to pathology
- Radiology shows similar silo-ization by imaging modality
 - Abdominal radiologists don't look above diaphragm
- Cardiology: echo, nuclear, sports, failure, transplant, etc
- Essence of modern medicine: goal to learn more about less
- Problem is no generalists for triage; patients provide glue

Second convergence: all pathology trainees learn pathology informatics

- For 20+ years, informatics has evolved as a separate silo
- Time for all trainees to become more “computer savvy”
- My personal goal: 20% of resident training in informatics
- Necessary to offset hospital momentum toward EMRs
- Necessary to provide oversight for LIS system integration
- Why this goal difficult => scarcity of experts in programs

Third convergence *across* dx: why radiology is thriving & CEO favorite

- Huge multinational corps. behind imaging: Siemens, GE
- New/enhanced imaging systems; yield high profit margins
- CEOs encourage capital investment in new modalities
- Digital radiology has increased radiologist productivity
- Maintain earning power in face of cost-containment
- Evolving new radiology goal: dx's instead of impressions

Short-term vision; closer collaboration with focus on breast mass diagnoses

- Radiology breast centers ; ideal for Integrated Dx Centers
- Large-scale screening; pts with suspicious lumps culled out
- Integrate surg path services seamlessly into rad processes
- Suspicious lumps immediately undergo FNA/core bx
- Rapid processing & digital path; goal of dx in 24-48 hours
- Success with breast dx carried to thyroid, liver, lung, ovary



Details of the Integrated Diagnostic Center (IDC)

A new model for pursuing integrated dx: Integrated Dx Centers (IDCs)

- PCPs refer pts with unknown mass (e.g., breast) to IDC
- IDC staffed by diagnosticians + patient-intake clinicians
- Efficiencies: parallel processing, two shifts, collaboration
- Digital pathology key element in rapid processing
- Portability of images enable off-site final tissue diagnoses
- IDCs will resonate with oncologists; only accept dx'ed pts

Short-term vision for Integrated Dx: multi-disciplinary diagnostic teams

- Multi-faceted diagnosticians; unrealistic short-term goal
- *Most* patient diagnoses can be addressed without MDTs
- Complex patients managed Dx-MDTs conferencing virtually
- Such Dx- MDTs composed of radiologists and pathologists
- Develop “super-dx’s”; consolidation of individual dx reports
- Compare/contrast goals of clinical vs. diagnostic MDTs



The virtopsy and its relationship to Integrated Diagnostics

The virtopsy; combining the classic autopsy with a total-body CT scan

- Essence of virtopsy; autopsies begin with whole body CT
- Then, selected bx utilized to confirm already “dx” disease
- Autopsy/virtopsy permission rate increases; OK to stop @ CT
- Greatly reduced cost/time; improved disease identification
- Virtopsy now the standard-of-care for U.S. military autopsies
- Enables path residents acquire skill to interpret CT scans

Why the virtopsy not more widely adopted in the U.S.

- Virtopsy clearly superior to the classic autopsy in all ways
- Can use high-resolution doses for high-definition images
- Forensic autopsies; superior documentation of lesions
- Post-mortem vascular image; allows detection of subtle lesions
- Capital expenditure issue; installing CT scanners in morgues
- Also need to retrain pathologists to interpret CT images



Long-term vision for Integrated Dx: Department of Dx Medicine

Longer-term vision for Integrated Dx: images + tissue + molecular dx

- Ultimately, will train diagnosticians by major organ systems
- Each would employ all available technologies => diagnosis
- Multiplexed biomarkers; critical for predictive/dx medicine
- Forge tight relationships with similarly oriented clinicians
- Entering golden era of diagnostics; dx requires most effort
- Treatment (surgery, drug) will be obvious based on the dx

Integrated Diagnostics inevitable; question only how we get there

- “Integrated dx” thriving now in large GI/GU clinical groups
- GI/GU specialists hiring pathologists for in-office labs
- In-office labs have thrived: tight integration/collaboration
- Will pathologists emerge as contract players or co-equals?
- These efficiencies will soon be more broadly recognized
- However, pressure for GI/GU groups to merge with hospitals

Barriers to pursuit of convergence: incumbents with stake in *status quo*

- Frequently, successful incumbents resist some changes
- Teaching programs often managed by these incumbents
- Early and necessary shift: adoption of digital pathology
- Digital images portable; enable greater productivity/flex.
- Pathologist need to lobby for capital costs for conversion
- Hosp. executives; resonate to integrated dx when explained

Drivers for convergence: impetus from pathologists seeking higher quality

- Change always comes from those who are dissatisfied
- We need more “change agents” willing to swim upstream
- Belief that “tried and true” can be improved upon
- Molecular imaging in Radiology; convergence occurring
- Also rapid advances in non-invasive optical microscopy
- Political power can result from merged Path + Radiology



Why digital pathology essential for the adoption of Integrated Dx

Digital pathology provides flexibility to surgical pathology workflow

- Emerging mantra for healthcare: cheaper, faster, better
- Digital pathology enables off-site interpretation of slides
- In some cases, this may involved off-shore support
- At the very least, we need to think of two work shifts
- Goal should be definitive dx in about a day after receipt spec.
- Labor saving of automated, quantitative IHC w/algorithms

Why radiology 100% digital with pathology ~5% adoption of technology

- Major consideration: slow maturation of technology
- New radiology modalities => digital from birth
- Older radiologists forces to adapt to digital technology
- For pathology, no additional revenue; analog => digital
- Pathologists required to justify the capital expenditure
- Professional challenge of retraining with the new technology

A new perspective on the ROI for digital pathology; integrated AP & CP

- Digital pathology will not yield favorable ROI in short-term
- Histology automation making goals even more distant
- New model; large hospitals integrated with smaller ones
- Tougher surgical path cases of smaller: automatic review
- Esoteric CP specimens of smaller routed to larger hospital
- Acceptable ROI flows from *total* budgetary consideration



Key Role of Information Technology in Achieving Greater Integration

Information Technology *Sine Qua Non* of Integration at All Levels

- Every integration step/goal enabled by info technology
- Merger of all dx information precursor of int. dx. workflow
- Work engines of dx specialties: LIS, AP-LIS, RIS, and PACS
- Another integration opportunity => integration of IT systems
- Market will not automatically provide; need user demand
- LIS of future => local LISs integrated with national network

Pathologist dashboard/console: short-term IT integration solution

- As mentioned previously, dashboard key emerging device
- Large monitor(s) linked to back-end legacy dx systems
- Integrate data from EMR, LIS, RIS, Path/Radiology PACS
- Input from all dx systems to enable super-diagnostic report
- Substitute for single integrated systems/networks to follow
- Also require search algorithms to present key data elements



Competition for Integrated Dx (ID): Total Integrated Care by Organ (TICO)

Total Integrated Care by Organ (TICO) Moving Rapidly; Is This the Future?

- TICO => coalescence of medical specialists by organ system
- Moving rapidly in cardiology; other specialties (GI?) may follow
- Cardiology has controlled its dx procedures from beginning
- Current TICO models have not rolled up path/lab medicine
- Most successful model; in-office labs/imaging in GI, GU, Derm
- Threat to these in-office labs; hospitals buying these practices

Advertisement in NYT for the University of Alabama; 9/24/2011s

| Heart and Vascular Services | Heart and Vascular Services |
|---|--|
| Adult Congenital Heart Disease | Pediatric Cardiology |
| Adv, Heart Failure/Pulmonary Hypertension | Pediatric Cardiovascular Surgery |
| Cardiac MRI and CT | Pediatric Electrophysiology |
| Cardiographics | Pediatric Interventional Cardiology |
| Cardiovascular Surgery | Pediatric MRI and CT Imaging |
| Echocardiography | Pediatric Transplantation/Pulmonary Hypertension |
| Electrophysiology | Preventive Cardiology |
| Fetal Echocardiography | Thoracic Surgery |
| General Cardiology | Vascular and Interventional Radiology |
| Hypertension | Vascular Surgery and Endovascular Therapy |
| Interventional Cardiology | Vascular Medicine |
| Nuclear Cardiology | |

Can TICO and Integrated Diagnostic (IT) Models Co-exist in hospitals?

- TICO model proven and successful service delivery model
- TICO also a natural for clinicians focused on single organ
- TICO also natural for patients; “See my heart doctors”
- No reason that TICO & ID can't coexist in hospitals
- Integrated Dx Centers; receive referrals from TICO teams
- Practicality of Integrated Dx not yet proven on large scale



Wrap-up and discussion

Wrap-up and Take-Home Points

- Integration and convergence => better, cheaper, faster care
- First level and easiest: closer blending of AP and CP
- Second level: train all pathology residents in informatics
- Third level: merger lab medicine/pathology w/ radiology
- Integrated Dx Center: serve pts with undiagnosed masses
- Efficiency => ability to parallel process & integrate services

Wrap-up and Take-Home Points (cont.)

- Virtopsy: modernize class autopsy; add full-body CT scan
- Longer term vision for ID => Dept. of Diagnostic Medicine
- Digital pathology essential for adoption of integrated dx
- Key role of IT in integrated dx vision; pathology dx dashboard
- TICO vs. IT model; former with traction & clinician support
- Final words: think about int. dx.; small gains my yield benefits