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Do cardiologists increase their medico-legal risk when they overuse or underuse diagnostic tests?

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HOW

Descriptive analysis on all closed CMPA cases involving cardiologists over 10 years (2008-2017).
Used the CMPA coding framework to determine provider, team and system contributing factors

WHAT

CMPA cases involving diagnostic issues all physicians (10 years)
n=2,822

CMPA cases involving diagnostic issues and cardiologists
n=67 (2.4%)

Diagnostic test **overuse**
n=0

Diagnostic test **underuse**
n=21*

14 cases involved diagnostic imaging (e.g. echocardiograms)
9 cases involved diagnostic procedures (e.g. treadmill exercise stress tests)
2 cases involved blood tests

** cases may involve more than one diagnostic test*

WHY

Factors that contributed to diagnostic test underuse included:

- **thoroughness of patient assessment**
- **physician-to-physician communication**
- **test management systems**

CONCLUSIONS

CMPA research findings:

- **cases due to cardiology diagnostic test underuse are rare**
- **there were no cases of overuse**
- **the results support the use of evidence-based recommendations from Choosing Wisely Canada**

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The Frequency of Repeat ANA Testing in Ontario: A population-based study

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Background: The Canadian Rheumatology Association Choosing Wisely statement says "Don't order ANA test unless specific signs and symptom of SLE/CTD present".
- Many rheumatologist said they were already following this and did not need to change.
- Duplicate antinuclear antibody (ANA) lab testing can be unnecessary, potentially harmful, and costly.
- Once positive, repeat ANA testing has little clinical value in monitoring disease activity or predicting a flare

Goal: To assess the frequency of repeat ANA testing in the province of Ontario, Canada and evaluate factors associated with repeat testing.

Activities/ Methods: We identified all repeat ANA tests within 12 months of a previous test performed over 2008-2016 among adults within the Ontario Laboratories Information System (OLIS), a nearly population-wide laboratory database linked with health administrative data.
-We assessed patient and provider-level factors associated with the odds of repeat testing within 12 months of a previous test, as well as any repeat test in which the previous test was positive using two separate marginal logistic regression models by means of generalized estimating equations

Impact:
- In total, 587,297 ANA tests were performed between 2008 and 2016, and 25% were repeats. Among 81,066 tests repeated within 12 months, 41% had a preceding positive result (@ $24/test, total >$700,000).
- Rheumatologists performed more repeat tests within 12 months compared to other specialties (36% vs 11%).
- After adjusting for patient and physician characteristics, the odds ratio (OR) of repeat testing within 12 months on patients with prior positive test results was 2.51 (95% CI 1.87, 3.39) for rheumatologists, and 1.31 (95%CI 1.02, 1.69) for family physicians.

Challenges:
-Retrospective administrative data used, thus unable to determine the clinical reason to support repeat testing

Lessons Learned:
- We observed a high frequency of repeat ANA testing in Ontario overall, many of which were performed on patients with prior positive tests
- Rheumatologists were most likely to perform repeat testing
- These findings suggest that interventions to develop a rational and fiscally responsible way of ordering ANA tests amongst rheumatologists are needed

Appropriateness of Parenteral B12 Administration in a Real-World Population

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Importance: Vitamin B12 deficiency can cause severe pancytopenia, spinal cord demyelination, and cognitive dysfunction. Randomized controlled trials have shown that oral B12 supplementation is as effective as parenteral B12 administration in improving hematologic and neuropsychiatric abnormalities, and raising B12 levels. Despite this, parenteral B12 is routinely administered to patients.

Objective: Using real-world laboratory data from health system administrative databases, we aimed to assess the prevalence of inappropriate vitamin B12 supplementation.

Design: We undertook a population-based, retrospective cohort study from January 1, 2011 to September 30, 2015 using available databases from laboratory services, physicians claims, drug benefits and hospital discharges in Ontario housed within ICES.

Participants: We included all persons aged 65 and older who received an intramuscular B12 prescription at least once during the study interval.

Main Outcomes and Measures: Our primary outcome was the proportion of inappropriate B12 supplementation. This was defined as persons with a normal serum B12 level (≥221 pmol/L) or those without a documented B12 level in the 12 months prior to receipt of their first intramuscular B12 injection. Other outcomes assessed included physician and patient predictors of inappropriate B12 supplementation, cost of inappropriate B12 supplementation, and prevalence of B12 deficiency.

Results: Of 146,850 patients who were prescribed intramuscular B12 in Ontario during the study interval, 63.7% received inappropriate prescriptions. The annual cost of inappropriate B12 prescribing was estimated to be $45.6 million. Patient factors that predicted receipt of inappropriate B12 included being female, older, living in a rural setting, and having higher co-morbidity scores. Physician factors that predicted inappropriate prescribing of B12 included being male, attending a Canadian medical school, specializing in Internal Medicine, previously prescribing B12, and practicing for longer. The prevalence of true vitamin B12 deficiency (≤ 148 pmol/L) was 5.5%.

Conclusions and Relevance: The majority of parenteral B12 prescribed in Ontario was done so with either a documented normal B12 level or without B12 documentation in the year prior to supplementation. Initiatives are thus required to educate physicians and patients on appropriate indications for IM B12 prescriptions, to reduce unnecessary care.

Routine Creatine Kinase Testing Does Not Provide Clinical Utility in the Emergency Department for Diagnosis of Acute Coronary Syndromes

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BACKGROUND: Creatine kinase (CK) continues to be measured in the work-up of chest pain in emergency departments (EDs) across Canada despite the excellent sensitivity and negative predictive value of high-sensitivity cardiac troponin assays (hsTnT). This is likely because minimal evidence exists defining the utility of CK in the era of hsTnT, and even less examining whether CK is helpful in patients with elevated hsTnT at baseline, such as in chronic renal or cardiac failure. If CK is unhelpful for diagnosing AMI, it represents a significant unnecessary cost to the healthcare system. We aimed to determine whether CK plays any role in the diagnosis of AMI in the modern ED and potential cost-savings that could be achieved by limiting its use.

METHODS: We conducted a retrospective review of all adult patients presenting to a tertiary ED during the year 2017. We identified patients with entrance complaints likely to generate biomarker testing. We then identified all patients who had a negative or non-diagnostic hsTnT and a "positive" CK. We then conducted thorough chart review to determine whether any of these patients were diagnosed with AMI on that admission, or any suffered a major adverse cardiovascular event within 30 days.

RESULTS: A total of 36,251 ED presentations were reviewed; 9951 had relevant presenting complaints. 82.1% and 81.9% had hsTnT and CK measured, respectively. 2,012 had non-diagnostic hsTnT with positive CK. Of these, 1 patient was diagnosed with AMI (and this diagnosis was controversial). 1 additional patient subsequently underwent unplanned coronary catheterization within 30 days. hsTnT ruled-out AMI in >99.9% of cases, and >99.9% of CK measurements contributed no diagnostic value.

CONCLUSION: CK provides no value beyond hsTnT in the ED diagnosis of AMI, including in patients with elevated hsTnT at baseline. Eliminating CK from standard ED orders could result in significant system cost savings.

Total patients	CK measured	TnT measured	-TnT/+CK	Diagnosis of AMI	30-day MACE
9951	8150	8167	2012	1	2
	81.9%	**82.1%**	**20.2%**	**0.012%**	**0.025%**

CHALLENGES

Knowledge translation: "CK/Trop" engrained in the minds of physicians, students, nurses, and unit clerks.

Engrained beliefs: Use of CK for "earlier detection", re-infarction, estimation of infarct size still prevalent despite evidence to the contrary.

Disconnect between Academia and Real World: Widespread belief that CK is no longer ordered despite the fact that it still is in many centers across Canada and North America.

DIRECTIONS

Policy Development: In conjunction with relevant local authorities and Choosing Wisely Mantioba, have developed a provincial policy stating the CK should not be ordered in the work-up of chest pain.

Knowledge Translation: Knowledge translation projects underway to study the implementation of this new policy.

Addressing the Disconnect: Study currently being developed to investigate current awareness and implementation of this and other Choosing Wisely recommendations across Canada.