Air Embolism's New Scarlet Letter

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On October 1, 2008, federal Centers for Medicare & Medicaid Services (CMS) policy went into effect, eliminating Medicare facility payments for certain hospital-acquired adverse conditions (1, 2). With input from the National Quality Forum and the general public, eight so-called "Never Events" were compiled, adopted and encouraged for additional incorporation into individual states' Medicaid systems (3). Included among these Never-Event hospital-acquired conditions (HACs) are catheter-associated infection, unintended retained operative foreign body and air embolism.

In selecting its initial eight HACs, CMS judged five attributes to be desirable:

"1. unambiguous;
2. usually preventable;
3. serious;
4. indicative of a safety system problem; and
5. important for public accountability" (4).

Closer examination reveals that the first attribute pertains to a condition being "clearly identified" by a unique ICD-9 diagnostic code (5, 6). This dubious equivalence of non-ambiguity and ICD-9 codeability might not pose concerns regarding the operatively retained foreign body. That condition is both explicitly codeable and with little doubt as to final diagnosis. (Either a hemostat was left in the peritoneum or it was not.) For the case of air embolism, however, such bright line diagnostic certainty is often lacking, and unintended consequences could result.

The diagnosis of arterial gas embolism is predominantly clinical (7). The decision to treat should not hinge on gas confirmation by computed tomography (8-10). For patients at risk, the diagnosis should be high on the differential; and "under suspicious circumstances, air embolism should be assumed present unless proven otherwise" (11). Expeditious hyperbaric treatment can improve clinical outcome, even in absence of radiographically demonstrable air (10).

Under federal reasoning, withholding payment for a forbidden HAC deters against its future occurrence (4). Whether this holds true specifically for iatrogenic air embolism can be put to the test. CMS maintains data linking individual reimbursements to ICD codes, serving as window into disease incidence. For instance, in 2007, CMS noted 57 cases of air embolism among Medicare beneficiaries (5). Notwithstanding its ostensible small size, this figure (as well as perhaps others) could serve as a baseline against which to gauge effects of the new rule.

Unfortunately, not only might confounding variables result in the wrong conclusion as to causation, an unanticipated effect of the primary variable itself could also lead to error. Let's presume that the reported incidence of air embolism, by whoever's measurement, does diminish after rule implementation, resulting in a declaration of victory by federal rulemakers. Alas, the victory is a mirage, albeit the direct result of the rule, but a mirage nonetheless.

The reality: Due to its new stigma and old inherent diagnostic uncertainty, there are simply fewer diagnoses of air embolism being made

for patients who previously would have received the diagnosis. If frank air isn't henceforth manifest on the CT, then it didn't happen. There will be ongoing hospital fiscal incentive against diagnosing (and consequently treating) the unsure or questionable case. Patients with small subtle air emboli run the risk of being denied their definitive treatments (10, 12) and could suffer long-term neurologic sequelae as a result.

Is the above argument tantamount to declaring a federal rule to be flawed and potentially harmful to patients due to speculated effects on dishonest providers? No. It is merely an observation that there now exists a sizeable factor to tip otherwise balanced medical decision scales towards one direction. This consequence is foreseeable to those having foresight.

The scarlet "A" worn by Hester Prynne "had an effect like a spell … enclosing her in a sphere" in announcing her adultery to seventeenth-century Boston (13). In contemporary American hospitals, "A" now stands for air. Having it found where it ought not be is a stigmatized scarlet "Never Event." Those caring for patients and performing procedures at risk should continue refining preventive strategies. Referring practitioners and consulting hyperbaracists should remain objective when assessing patients for air embolism. Professionals must resist coercion – overt or subtle – against making the diagnosis and must maintain appropriately low thresholds for presumptive treatment with hyperbaric oxygen.

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