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Reducing the Incidence of Retained Double-J Ureteral Stents: A Multidisciplinary Approach

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Abstract

Introduction: Double-J® ureteral stents are temporary tubes used for ureteral patency that can cause serious complications if left beyond the allotted time. We developed a streamlined framework that allows for Double-J stent tracking to alert patients to the need for removal.

Methods: By creating a multidisciplinary committee we developed a database of patients with Double-J stents who presented to our facility between 2012 and 2014. The database was populated by a query of the billing system, generating HIPAA compliant stent removal reminder letters. Three queries (A, B and C) were developed using a combination of billing codes and each query was compared to a gold standard list.

Results: The ICD-9 ureteral catheterization code used to perform query A was only 28% sensitive. Query B (using CPT or HCPCS codes) was 98% sensitive. However, it incorrectly captured many patients with nonureteral stents. Our final query method, query C, rectified this issue by using the ICD-9 code with CPT or HCPCS codes, resulting in the highest sensitivity (78%) while minimizing undesired stent capture.

Conclusions: We developed an automated and reproducible program that correctly identifies and alerts a high percentage of patients to the need to remove their stent. Repeated audits of our query methods combined with regular meetings of a multidisciplinary Double-J stent committee were integral to developing and maintaining this system. By promoting proactive awareness for patients as well as physicians, we are working to minimize the incidence of retained Double-J stents and associated complications.

Key Words: quality improvement, interdisciplinary communication, systems analysis

Abbreviations and Acronyms

CPT = Current Procedural Terminology

DJ = Double-J

EMR = electronic medical record

HCPCS = Healthcare Common Procedure Coding System

HIPAA = Health Insurance Portability and Accountability Act of 1996

ICD-9 = International Classifications of Disease, 9th revision

OR = operating room

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The increasing scrutiny focusing on cost-effective health care in the United States emphasizes the importance of preventing complications from all surgical procedures.[1] With the increasing prevalence of urolithiasis and other urological diseases presenting in the U.S., it is essential that we identify the safest and most effective methods of treatment.

First introduced in the 1970s, DJ stents were immediately recognized for their innovation.[2] These stents are non-permanent tubes put in place for ureteral patency. If not removed or replaced within the specified period, DJ ureteral stents can become retained, and lead to serious medical issues such as hydronephrosis, renal failure, the need for radical nephrectomy or death from sepsis.[3–5] These retained stents, those that cannot be removed via standard cystoscopic methods, often must be removed by costly and invasive procedures including extracorporeal shock wave lithotripsy, complex ureteroscopy with holmium laser, percutaneous nephrolithotomy or even open surgical extirpation. Removal via such an invasive treatment is nearly 7 times more costly than the average "timely stent extractions."[6]

The potential medicolegal problems that can arise from indwelling stents have long been met with various solutions. In 1978 Finney described this experience with the indwelling DJ stent and emphasized the need for urologists to "keep a [stent] log to be certain that none is forgotten."[7] This suggestion evolved into today's widely used stent log, a manually maintained paper record of all patients with stents in place. While any method is preferable to no method, the efficacy of the paper based log was dependent upon manual input and review.[8]

In 2008 Tang et al conducted a 5-year retrospective analysis which described their institution's experience with a stent card registry.[9] Overall 94% of patients with stents placed during this period had an accompanying stent card in their register. Of the stents with accompanying stent cards 5.4% were overdue for removal and 25% had no subsequent record of ever being removed.

In 2000 Ather et al published their findings from a review of the stent management program at the Aga Khan Hospital in Pakistan.[10] Relying entirely on a manual, paper based tracking system, they experienced retained stent rates of 12.5%. After the implementation of a computerized manual entry system in the operating room, they saw their retained stent rates fall below 2%.

The greatest shortcoming of these stent tracking systems was that they relied fundamentally on the energy and commitment of the staff. Lynch et al pioneered a nearly entirely automated electronic stent tracking system that attempted to reduce the potential for human error.[11] A similar protocol was established in 2014 by Sabharwal et al, who found that patient compliance was most responsive to SMS (short message service) messaging.[12] With these automated reminder systems the opportunity to prevent retained stents becomes a greater possibility with less room for manual input error.

Our hospital is a tertiary referral center in Charlotte, North Carolina, with a large (more than 1,000 per year) number of stents placed annually. Noting an unacceptably high number of patients presenting to our institution with retained stents in the early 2000s, we formed a multidisciplinary committee to perform a root cause analysis. The committee included urologists, urology administration, administrative and clinical nursing, interventional radiology staff, quality management and performance enhancement leaders, IT staff and urological researchers. In an effort to improve ureteral stent related safety, the committee developed a novel, reliable and automated method to identify and inform patients and physicians of the need for timely stent removal.

We created a billing system based reminder program to generate HIPAA compliant letters that are sent to patients and EMRs, reminding them of the need for stent exchange or removal. In this article we describe our solution to the problems involved in alerting patients to the need for timely stent removal. In addition, we will discuss future enhancements that may help minimize the incidence of retained DJ ureteral stents.

Materials and Methods

Privacy concerns were minimized by using a retrospective chart review and de-identifying all data. The study design was approved by the institutional review board. At our institution urologists and interventional radiologists place stents with great frequency. As such, we developed a dynamic protocol to manage stent placement (fig. 1). Regardless of the operating physician, the record of the stent placement is transferred monthly to our hospital-wide billing system.

We then worked to determine the data that would be most useful for identifying our patients with DJ stents in the billing system. This highlighted the use of procedural or billing codes. Our initial criteria for identifying patients in the system used the ICD-9 procedure code 59.8 for ureteral catheterization (query method A). Using query method A in the billing system we generated monthly reports of all stents placed. These reports resulted in letters detailing the need to remove the stent, the process of removal and the consequences of a retained stent (fig. 2). Letters were sent to the patient and the EMR.