

Incorporating pharmacogenetic testing into perioperative pain management to support personalized care

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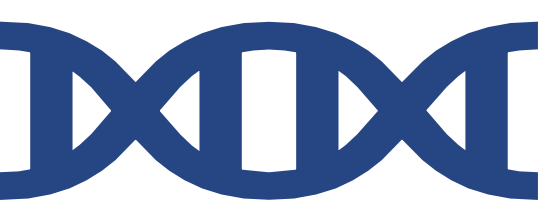
INTRODUCTION

At Hospital for Special Surgery (HSS), our Perioperative Pain Service (POPS) identifies patients at risk for poor postoperative pain outcomes and tailors perioperative pain management approaches where indicated. With the goal of providing personalized care to patients at particularly high risk of poor postoperative pain outcomes, POPS implemented pharmacogenetic testing for patients with a history of uncontrolled pain. Herein, we describe the process of identifying candidates for pharmacogenetic testing, the process of testing and communicating results, how testing can impact patient-centered pain care, and provide descriptive characteristics of patients who have undergone testing thus far.

METHODS

- Pharmacogenetic testing was adopted for clinical care purposes at HSS’ POPS in 2019 to support patient-centered perioperative pain management. The genetic test surveys 26 genes relevant to neurological and psychological conditions, including pain, identifies gene-drug associations and related level of risk (low, moderate, high) for increased/decreased drug exposure, as well as influencing environmental factors, and indicates therapeutic implications of specific gene results.
- Since its adoption, pharmacogenetic testing has been used to inform postoperative care among 16 HSS patients. If patients have a history of uncontrolled pain appears to be lack of medication efficacy (i.e., exposed to ≥ 3 opioid medications without effect or < 3 with family history of lack of efficacy) or dose limiting adverse reactions to multiple pain medications, patients may be referred for a pharmacogenetic test.
- Sample collection (buccal cells) and shipment typically occur on the day of the evaluation, with results available to the provider within 2 weeks. Results are reviewed with the patient and communicated to the surgical team.
- To describe this subset of patients, with appropriate IRB approval, demographic (age, sex, race, ethnicity) and clinical (ASA class, surgery type, anesthesia type) characteristics, as well as length of stay and opioid discharge medications prescribed were extracted and summarized using descriptive statistics.

For surgical patients with risk factors for poorly controlled postoperative pain, personalized pain management plans are necessary.



Pharmacogenetic testing can inform personalized pain treatment decisions, including selection of specific opioids and tailoring of adjuvant pain medications to the patient’s pharmacogenetic profile.

RESULTS

Patients (N=16) ranged in age from 51 to 89 years old (mean=65.7, SD=11.7) and were primarily female (n=12; 75%), and non-Hispanic White (n=15; 93.4%).

Patients (ASA class II: n=12; 75% or class III: n=4; 25%) were most commonly undergoing total joint replacement (n=10; 62.5%, 8 total knee and 2 total hip) or spine fusion or decompression (n=4; 25%) under regional (n=11; 68.8%) or general (n=4; 25%) anesthesia, respectively. Most patients received a peripheral nerve block (n=13; 81.3%). Length of stay ranged from 6 hours to 14 days (mean=3.7, SD=3.4; median=2.7). Two patients (12.5%) were discharged on no opioids, 3 (18.8%) on 50 mg tramadol, 3 (18.8%) on 25 or 50 mg tapentadol, 3 (18.8%) on 5 mg oxycodone, 1 (6.3%) on oxycodone-paracetamol, 1 (6.3%) on 7.5 mg morphine, or 3 (18.8%) on 2 mg hydromorphone.

DISCUSSION

Pharmacogenetic testing may be used to inform personalized pain care and to minimize trial and error for patients presenting with a history of poor postoperative pain control with evidence of poor response to standard medication protocols.

While incorporation of pharmacogenetic testing is feasible, barriers to obtaining this test include time to surgery (given turnaround is typically 7-14 days) and cost (testing is typically not covered by insurance and out-of-pocket cost is around \$500).

Evidence of the effectiveness of pharmacogenetic testing on patient outcomes is needed. A forthcoming analysis will compare patients who received pharmacogenetic testing to matched pair controls. Future prospective studies, including randomized clinical trials, to determine the clinical impact and cost effectiveness of pharmacogenetic testing (ideally among diverse demographic and clinical patient populations) in the perioperative setting are warranted.

