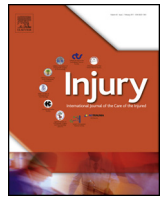




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Original article

Lasting impression of violence: Retained bullets and depressive symptoms[☆]

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ABSTRACT

Background: Over 70,000 nonfatal firearm injuries occur in the US annually, frequently leaving victims injured with retained bullets. The long-term psychological risks associated with retained bullets remains unstudied. By serving as a constant reminder of injury, we hypothesized that the presence of retained bullets after firearm injury is associated with increased PTSD and depression symptom severity.

Methods: We conducted a prospective cohort study (2013–2015) of Black male survivors of firearm injury at an urban Level I trauma center. Interviews, questionnaires and validated survey tools for PTSD (PCL-5) and depression (QIDS-SR₁₆) to assess severity of symptoms were administered 3 months post-injury. Clinical characteristics and symptom severity scores were compared with respect to retained bullets using Wilcoxon Rank Sum tests and linear regression.

Results: Of 139 participants, 101 (73%) had retained bullets. The cohort was young (mean age 26 years), educated (82% high school or greater) yet unemployed (53%) and with multiple injuries (median [IQR] no. of GSWs 2 [1–3]). There was no difference in age, education, employment status, number of gunshot wounds, operative procedures, pain, hospital or ICU LOS between groups ($p > 0.05$). Patients with retained bullets less often rated their health as “very good” or “excellent” (10% vs 29%, $p = 0.046$). Of those working prior to injury ($n = 47$), 61% with retained bullets had not returned to work compared to 33% without retained bullets ($p = 0.027$). No difference in PCL-5 scores [30.9 (SD 18.9) vs 27.9 (SD 18.6), $p = 0.470$] was observed, but patients with retained bullets had greater mean QIDS-SR₁₆ scores [10.7 (SD 6.2) vs 7.8 (SD 6.1), $p = 0.038$] than those without. After controlling for injury severity, number of wounds, marital status and education level, multiple linear regression analysis determined that retained bullets ($\beta = 3.52$; $p = 0.017$) were associated with more severe depressive symptoms.

Conclusion: Retained bullets are associated with adverse psychological consequences after firearm injury. To improve recovery and to aid in clinical management decisions, clinicians should consider both the psychological and physical effects of retained bullets in survivors of firearm injury.

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Introduction

Firearm violence represents an ongoing public health crisis in the United States of America. Nearly 32,000 individuals die annually as a result of firearm violence, with homicides of young adults 15–30 years of age accounting for approximately one third

of these deaths [1]. An additional 100,000 individuals are non-fatally injured by firearms each year [1,2]. There is no current standard medical practice to remove bullets after a firearm injury, as research addressing the physiologic and psychological effects of retained bullets among survivors is limited. The general rule at many medical institutions, including the study institution, is to

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leave bullets in place after injury unless they are or become easily accessible (superficial or during laparotomy), potentially morbid (close proximity to nerves or vessels), symptomatic, or per patient request.

Previous studies examining the potential physiologic risks of retained bullets have found such issues as elevated serum lead levels [3–6], secondary osteoarthritis [7,8], chronic pain [9], infection [10–12], and neurogenic claudication and radiculopathy [13]. Often a bullet will be excised if there is an apparent medical benefit (e.g. treating injury-site chronic pain or preventing lead toxicity) [14], but there is a paucity of data regarding the psychological consequences of retained bullets to date. The removal of the retained bullet for any such non-physiologic reason depends on patient and surgeon agreement given a patient’s risk profile, without any universal, standard or evidence-based guidelines.

To this end, we hypothesized that the presence of retained bullets is associated with increased symptom severity of PTSD or depression, perhaps by serving as a reminder of the traumatic

event. Our primary study objective was to determine whether survivors of firearm injury with retained bullets have increased severity of psychological symptoms (i.e. PTSD and depression) compared to survivors without retained bullets.

Methods

Patient population

A large, prospective cohort study examining recovery patterns of Black men after all-causes of injury was conducted at our institution from 2013 to 2016. We performed a subgroup analysis of adult (age ≥ 18 years), Black, male patients who sustained injuries related to gunshot wounds. Men who were: (1) younger than 18 years of age, (2) unable or refused informed consent, (3) currently receiving treatment for PTSD or depression, (4) in police custody or (5) who sustained injuries unrelated to gunshot wounds were not eligible for study participation.

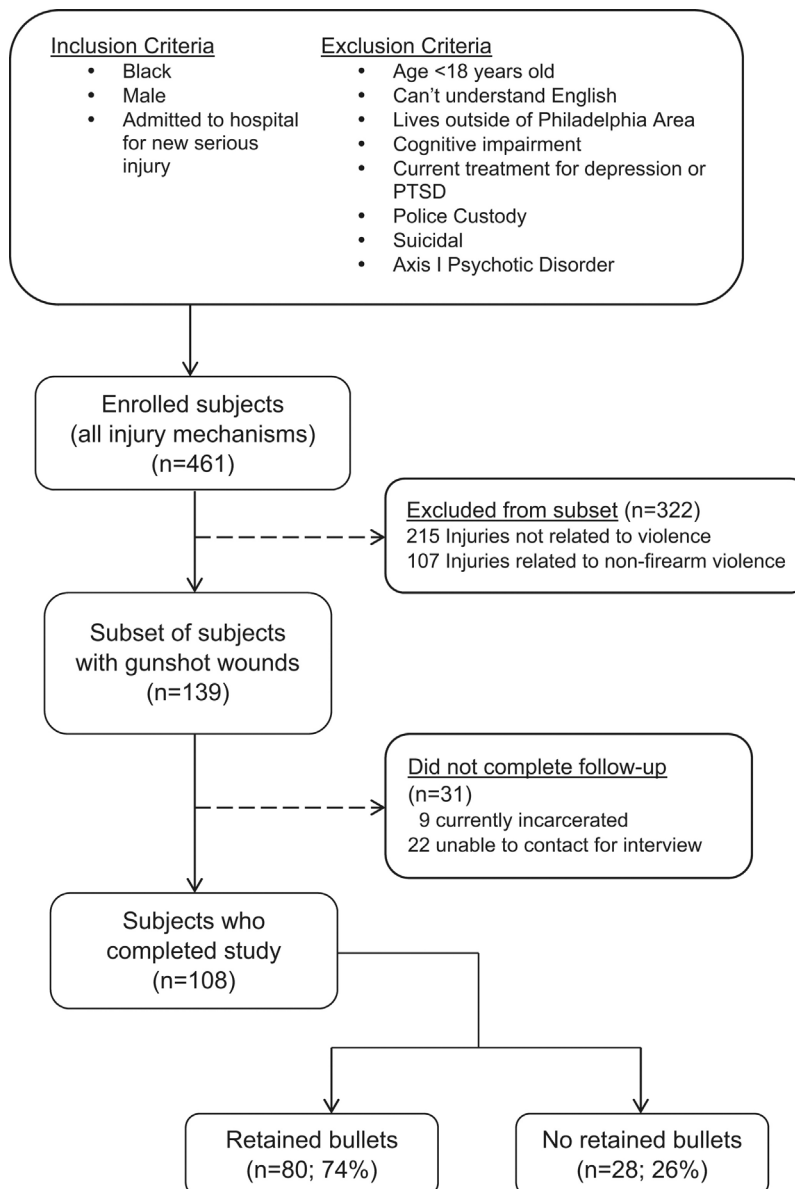


Fig. 1. Study design of patient population.

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