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Data Article

Polytraumatized patient lower extremity nonunion development: Raw data

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ABSTRACT

In this article we report data collected to evaluate the pathomechanistic effect of acute anaerobic metabolism in the polytraumatized patient and its subsequent effect on fracture nonunion; see "Base Deficit ≥6 within 24 Hours of Injury is a Risk Factor for Fracture Nonunion in the Polytraumatized Patient" (Sardesai et al., 2021) [1]. Data was collected on patients age ≥16 with an Injury Severity Score (ISS) >16 that presented between 2013-2018 who sustained a fracture of the tibia or femur distal to the femoral neck. Patients presenting to our institution greater than 24 hours post-injury and those with less than three months follow-up were excluded.

Medical charts were reviewed to collect patient demographic information and known nonunion risk-factors, including smoking, alcohol use, and diabetes. In addition, detailed injury characteristics to quantify injury magnitude including ISS, Glasgow Coma Scale (GCS) at admission, and ICU length of stay were recorded. ISS values were obtained from our institutional trauma database where they are entered by individuals trained in ISS calculations. Associated fracture-related features including fracture location, soft-tissue

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injury (open vs. closed fracture), vascular injury, and compartment syndrome were recorded. Finally, vital signs, base deficit (BD), and blood transfusions over 24 hours from admission were recorded. We routinely measure BD and less consistently measure serum lactate in trauma patients at the time of presentation or during resuscitation. BD values are automatically produced by our laboratory with any arterial blood gas order, and we recorded BD values from the medical record.

Clinical notes and radiographs were reviewed to confirm fracture union versus nonunion and assess for deep infection at the fracture site. Patients were categorized as having a deep infection if they were treated operatively for the infection prior to fracture healing or classification as a nonunion. Nonunion was defined by failure of progressive healing on sequential radiographs and/or surgical treatment for nonunion repair at least six months post-injury.

Specifications Table

Subject	Health and Medical Sciences: Orthopaedics, Sports Medicine and Rehabilitation
Specific subject area	Fracture non-union in the polytraumatized patient
Type of data	Table
How data were acquired	1. Institutional trauma database 2. Orthopaedic billing database
Data format	Filtered
Parameters for data collection	*Inclusion:* Patients age ≥16 with an ISS >16 that presented between 2013-2018 who sustained a fracture of the tibia or femur distal to the femoral neck. *Exclusion:* Patients presenting to our institution greater than 24 hours post-injury or those with less than three months follow-up.
Description of data collection	Data was collected by cross-referencing our institutional trauma database and our orthopaedic billing database. The institutional trauma database was used to generate patients age ≥16 with an ISS >16 that presented between the years 2013-2018.
Data source location	Indianapolis, Indiana, USA
Data accessibility	Hosted with Mendeley: Sardesai, Neil; Natoli, Roman (2021), "Polytrauma Base Deficit Non-Union", Mendeley Data, V1, https://doi.org/10.17632/9vb2f2gjhf.1 Data has been de-identified
Related research article	N. Sardesai, G. Gaski, Base Deficit ≥6 within 24 Hours of Injury is a Risk Factor for Fracture Nonunion in the Polytraumatized Patient, Injury. In Press. https://doi.org/10.1016/j.injury.2021.05.024.

Value of the Data

- These data are of value in orthopaedic traumatology and critical care medicine in the evaluation and treatment of the polytraumatized critically ill patient.
- These data will benefit clinicians who treat these patient by allowing early recognition of acute characteristics and clinical data that predispose patients to long-term sequalae, such as fracture non-union.
- These data can be used to validate future research and larger inquiries into this nascent field when evaluating characteristics that predispose polytraumatized critically ill patients with fractures of the lower extremities to fracture non-union.

1. Data Description

Filtered Data: Compiled data with collected patient demographic information, known nonunion risk-factors, detailed injury characteristics, fracture-related features, and vital signs, base deficit (BD), and blood transfusions over 24 hours following admission.

The data are presented in an excel spreadsheet. There is one tab for the fractures that healed (UNION) and another for fractures that did not heal (Nonunion). There are 427 rows in UNION and 54 in Nonunion. The columns are different factors that might be related to fracture healing status obtained from patient chart review. Patient demographic information and known nonunion risk-factors, including smoking, alcohol use, and diabetes were recorded. In addition, detailed injury characteristics to quantify injury magnitude including ISS, GCS at admission, and ICU length of stay were recorded. ISS values were obtained from our institutional trauma database where they are entered by individuals trained in ISS calculations. Associated fracture-related features including fracture location, soft-tissue injury (open vs. closed fracture), vascular injury, and compartment syndrome were recorded. Finally, vital signs, BD, and blood transfusions over 24 hours from admission were recorded.

Not all patients had a BD measured. Both the UNION and NONUNION tabs have the data sorted by column AC, "Worst Base Excess in 24 hours", in descending order (i.e., worst BD in the top row). Cells without an entry or a dash ('-') are missing data. Column N is shock index calculated as the ratio of heart rate to systolic blood pressure [2]. Hct (column AH) = hematocrit. TRISS (column AL) = Trauma and Injury Severity Score, which comprises the Revised Trauma Score (RTS), Injury Severity Score (ISS) indexes, as well as the trauma type (blunt or penetrating) and patient age [3].

2. Experimental Design, Materials and Methods

Data was collected by cross-referencing our institutional trauma database and our orthopaedic billing database. The institutional trauma database was used to generate patients age $\geq$16 with an ISS $>$16 that presented between the years 2013-2018. The orthopaedic billing database was then cross-referenced for CPT codes 27244, 27255, 27506, 27507, 27511, 27513, 27535, 27536, 27758, 27759, 27827, 27828. We subsequentially identified patients meeting the above criteria that were treated for repair of a nonunion (CPT codes 27720, 27722, 27724, 27725, 27470, 27472). Microsoft Excel 2011 was used to cross-reference CPT codes to identify patients that met inclusion criteria for an at risk fracture and subsequently went on to a nonunion that was treated with a nonunion repair code. Medical charts were reviewed to collect patient demographic information and known nonunion risk-factors, including smoking, alcohol use, and diabetes. In addition, detailed injury characteristics to quantify injury magnitude including ISS, GCS at admission, and ICU length of stay were recorded. ISS values were obtained from our institutional trauma database where they are entered by individuals trained in ISS calculations. Associated fracture-related features including fracture location, soft-tissue injury (open vs. closed fracture), vascular injury, and compartment syndrome were recorded. Finally, vital signs, BD, and blood transfusions over 24 hours from admission were recorded.

Ethics Statement

IRB Exemption: This research did not include any human or animal experimentation. All acquired data in this research was obtained and then individually identifiable health information was removed. This research received IRB exemption under 45 CFR 46.101(b) and/or IU HRPP Policy (see attached IRB exemption letter).

CRediT Author Statement

Neil Sardesai: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing - original draft, Writing - review & editing; **Greg E. Gaski:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing - original draft, Writing - review & editing; **Zachary Gunderson:** Data curation, Investigation, Project administration, Writing - review & editing; **Conor Cunningham:** Data curation, Investigation, Project administration, Writing - review & editing; **James Slaven:** Data curation, Formal analysis, Investigation, Methodology, Writing - review & editing; **Ashley D. Meagher:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Writing - original draft, Writing - review & editing; **Todd O. McKinley:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Writing - original draft, Writing - review & editing; **Roman M. Natoli:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

None.

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