



Introducing a Novel Referral Algorithm for Nasal Bone Fractures to Improve Patient Care and Utilization of Healthcare Resources

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ABSTRACT

Objectives: To analyze current referral patterns to the otolaryngology department for isolated nasal bone fractures and propose a novel tool for referring providers to optimize patient care and healthcare resources.

Study Design: Retrospective chart review and experimental model

Methods: A literature search was performed to create a referral tool based on best practice management of nasal bone fractures. The electronic medical record at our Level I trauma center was queried via CPT codes identifying isolated nasal bone fractures from August 2014-2015. Charts were reviewed for demographics, injury description, radiographic findings, and operative interventions (i.e. closed reduction, septal hematoma drainage). The total number of actual consultations and intervention rate was assessed and compared to the same data processed through the experimental referral algorithm.

Results: Review of records revealed that immediate otolaryngology consultation was made for isolated nasal bone fractures in 50 patients. Ten interventions were performed yielding an intervention rate of 20%. Upon reanalysis utilizing the proposed algorithm, only 8 immediate consultations would have been indicated and, of those, all would have undergone immediate operative intervention, yielding an experimental intervention rate of 100%. Chi-squared test revealed a significant difference in intervention rate between groups ($p < 0.0001$). The odds ratio for operative intervention when utilizing the algorithm was 91 ($p < 0.001$).

Conclusion: The current referral pattern for immediate otolaryngology consultation in nasal bone fractures reveals a low rate of operative intervention. Implementing a novel algorithm for referring providers to optimize rates of intervention is effective in improving patient outcomes while also reducing excess healthcare expenditures.

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Introduction

Nasal fractures are one of the most common injuries and account for greater than 50% of all facial fractures.¹ Interpersonal assault and motor vehicle collisions are a primary mechanism of injury.² Given the aesthetic and structural significance of the nasal apparatus, proper assessment and management of nasal injuries is essential to avoid negative cosmetic or functional sequelae.

The approach to nasal bone fracture management has been well described in the literature. Treatment via closed reduction, a procedure to realign the nasal bones without surgery, has been evaluated as an effective modality to achieve restoration of pre injury appearance and avoid long term nasal obstruction.^{3,4,5}

Ideal timing of closed reduction extensively favors immediate reduction in patients presenting prior to onset of nasal edema, often less than 4-6 hours from time of injury, to ensure that the operative provider can fully assess the reduction.^{1,2,5}

When edema is present, deferring immediate evaluation and treatment for at least 3-4 days and providing conservative supportive measures has been described as preferred management.^{1,2,5,6}

Studies have shown no decrease in patient satisfaction, cosmetic outcome, or long term nasal obstruction when reduction is performed up to 21 days post injury, with several groups recommending ideal fracture management within 7 days for children and 10 days for adults.^{5,6}

Methods

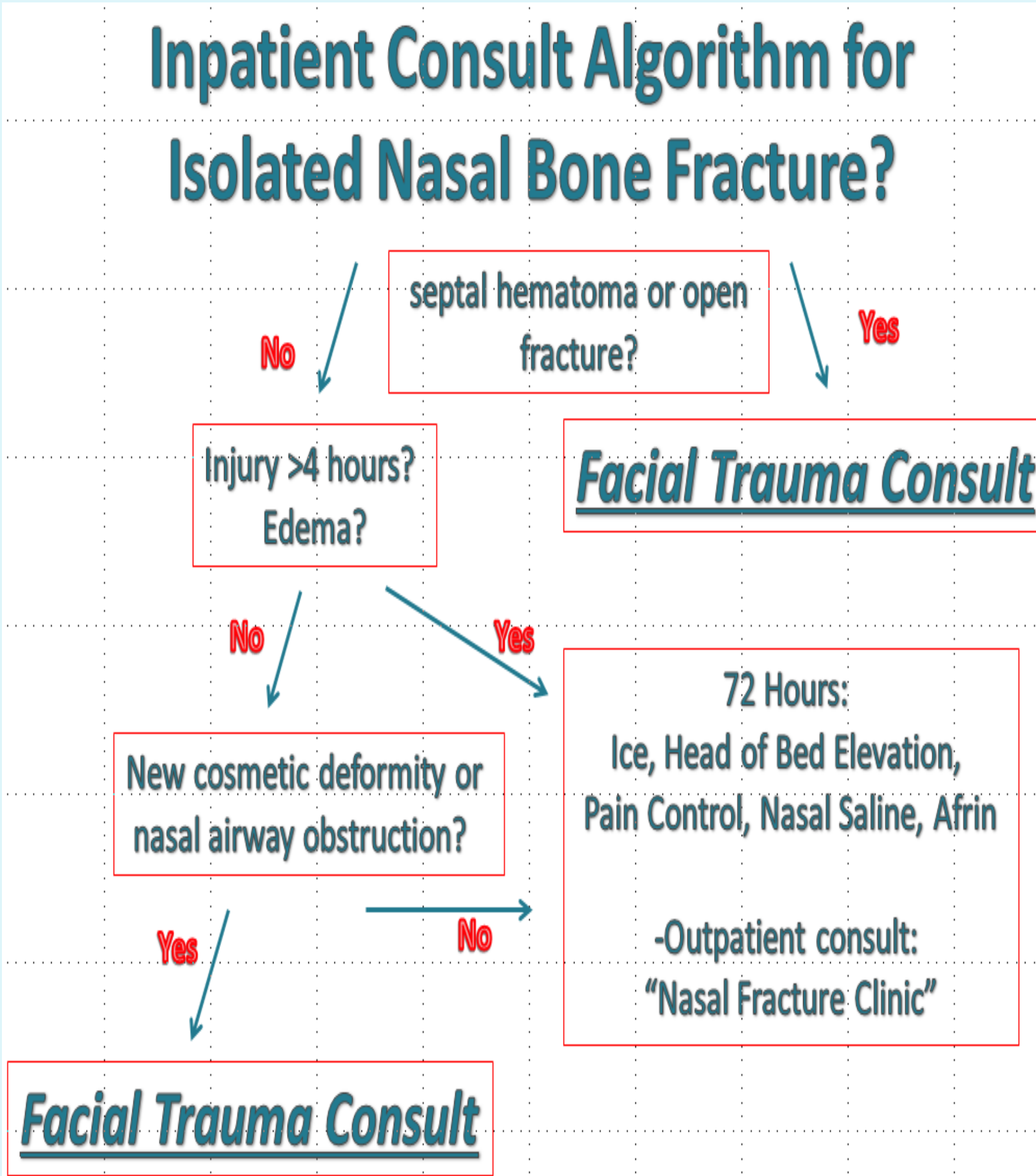
-A literature search was undertaken to build a referral algorithm based on best practice management of closed nasal bone fractures. (Figure 1).

-The electronic medical record was queried using CPT codes for isolated nasal bone fractures from August 2014-August 2015.

-Charts were reviewed for patient demographics, mechanism of injury, toxicology status, radiographic findings, and operative interventions (i.e. closed reduction, septal hematoma drainage).

-Using R statistical software, actual consultations and intervention rate was assessed and compared to the same data processed through the experimental referral algorithm.

Figure 1. Nasal Bone Fracture Referral Algorithm



Results

-50 consultations were placed for isolated nasal fractures from August 2014-2015. Mechanism of injury and toxicology findings are reported in Figures 2 and 3.

-10/50 (20%) underwent intervention. 2 patients underwent reduction, but should have been managed in a delayed setting due to significant edema at the time of consultation. (Figure 4)

-When re-evaluating these 50 patients utilizing the proposed algorithm, only 8 immediate consultations would have been recommended with all meeting indications for immediate intervention (8/8 = 100%).

-Chi-squared test revealed a significant difference in intervention rate between groups ($p < 0.0001$) and the odds ratio for immediate reduction when utilizing the algorithm was 91 ($p < 0.001$).

Figure 2. Mechanism of Injury.

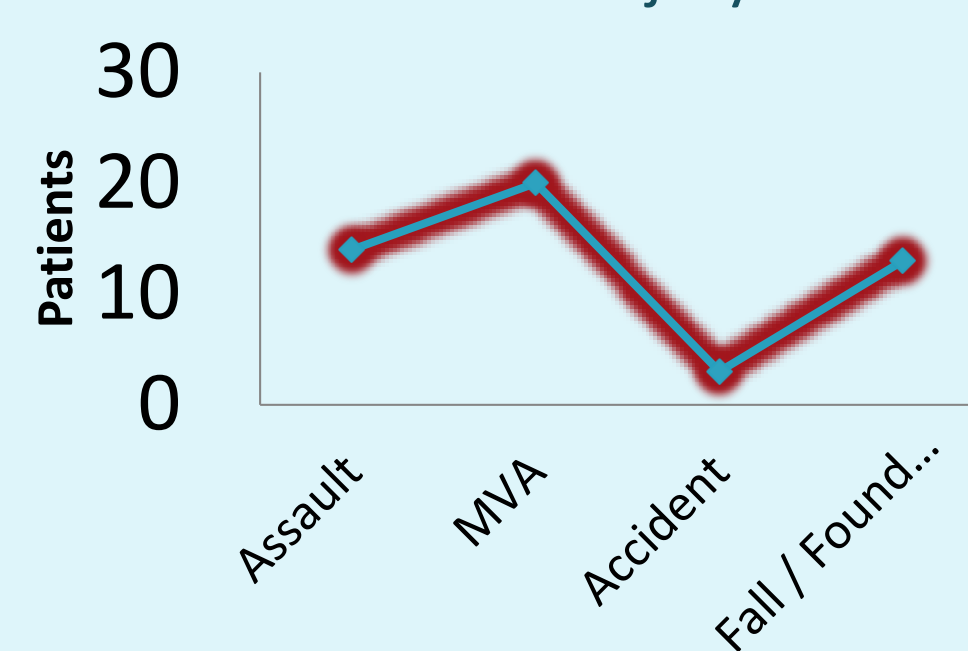


Figure 3. Toxicology.

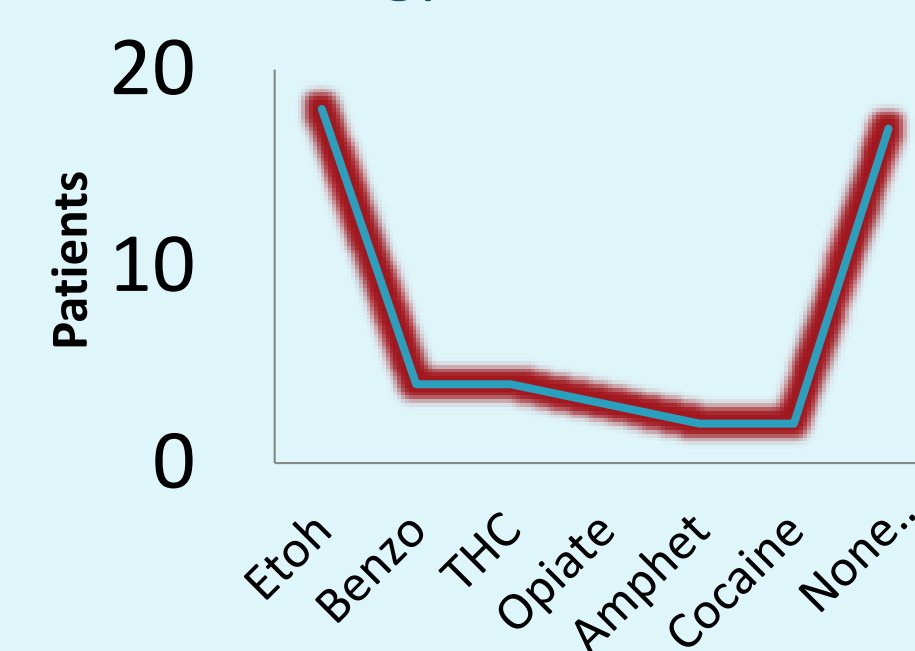
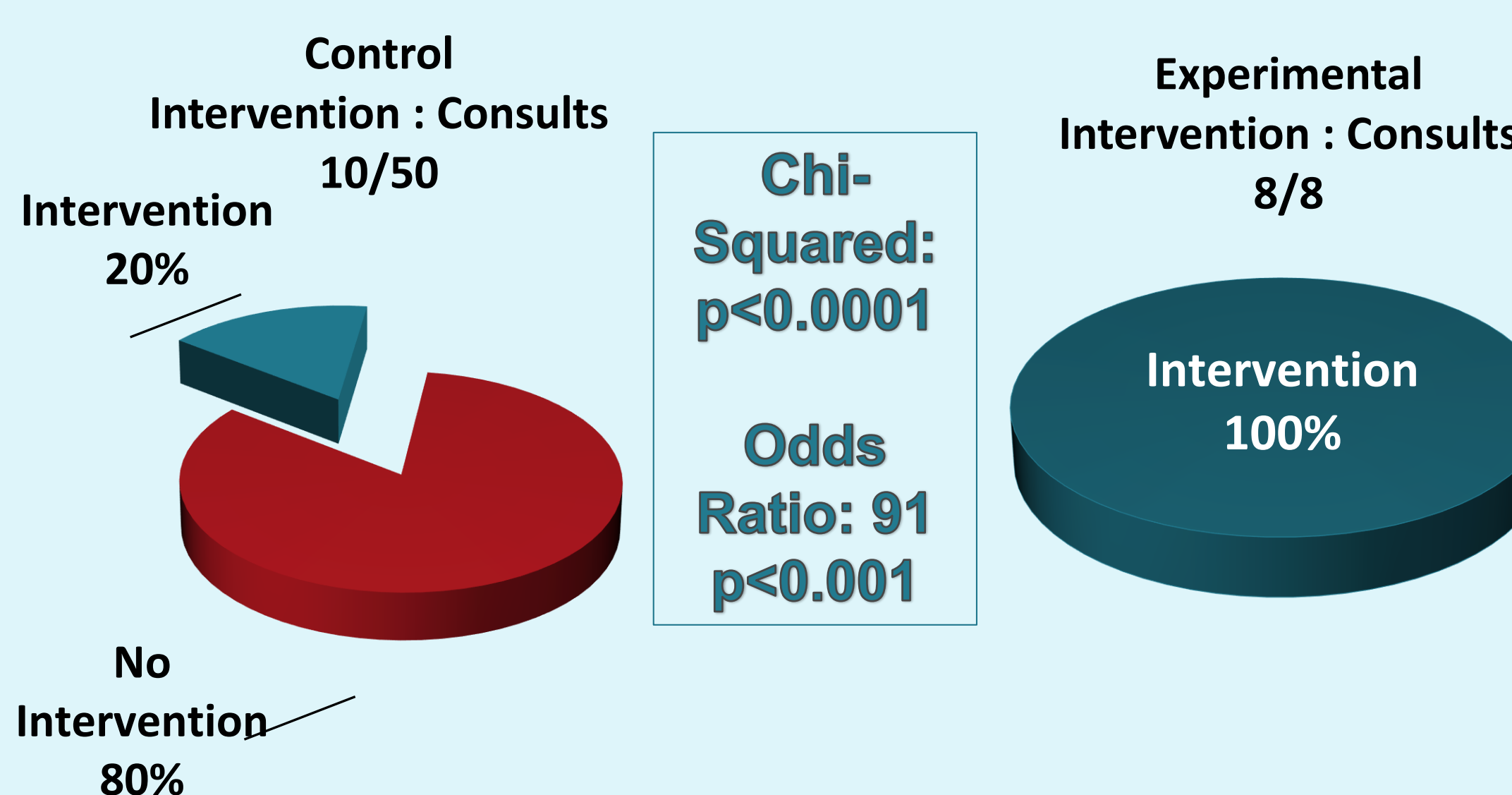


Figure 4 Control vs. Experimental Interventions.



References

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Discussion

-At our academic center, the on-call ENT resident responds to all ER consults within 30 minutes and inpatient consults within 24 hours.

-When factoring in travel time and consultation time, this utilizes a significant number of already limited resident work hours.

-Assault and motor vehicle accidents were the most common mechanisms of injury and intoxication was frequent.

-In the case of isolated nasal bone fractures, we identified that 50 immediate consultations were made from Aug '14-'15, with an intervention rate of 20%.

-A novel algorithm for referrals was developed to ensure optimal injury management and decrease resource mis-utilization in the form of lost resident work hours, missed clinical/surgical opportunities, and hospital disposition times.

-Retrospective implementation of the algorithm resulted in 8 immediate consultations for nasal fractures. Rate of intervention was 100%.

-When using the algorithm, the on-call resident would be 91 times more likely to intervene.

-For our institution, in a one year period, 42 inpatient consults would be appropriately referred to outpatient follow-up based on evidence based management.

-Over a year timeframe, implementation of this tool would result in 63 hours of additional resident availability, when estimating consult time of 90 minutes (i.e. travel, H+P, management, coordination of care, and documentation)

Conclusions

Current referral patterns for immediate otolaryngology consult for isolated nasal bone fractures reveals a low rate of intervention and a high utilization of limited resident work hours.

Implementing a novel algorithm for referring providers to optimize rates of intervention is effective in improving patient outcomes while also optimizing the resident educational experience.

Disclaimer

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