

Introduction

Patients with cerebrospinal fluid (CSF) shunts are medically complex and frequently present to the emergency department (ED) with suspected shunt malfunction. After adequate evaluation in the ED, patients may be discharged home, admitted for surgical intervention or admitted for observation. In this study, we examined the reasons for ED revisits within 7 days of the index ED visit.

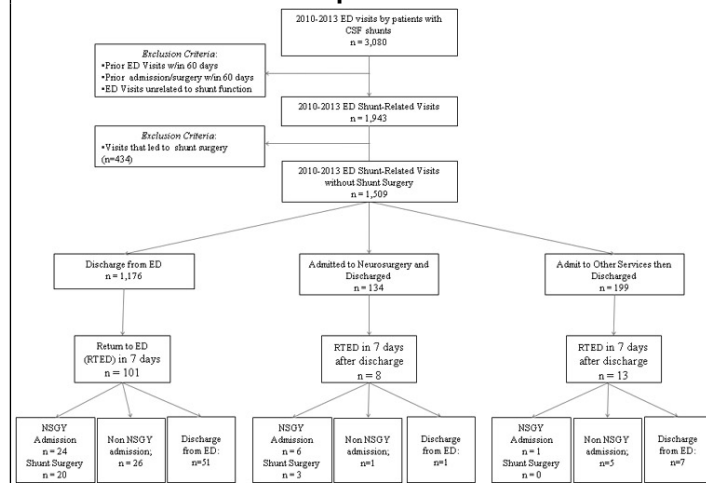
Methods

1,509 ED visits were included in this study. Final dispositions from the index ED included: home (n=1,176), admission to neurosurgery service for observation (n=134), and admission to other services (n=199). Subsequent events within 7 days, including ED revisits, hospital admissions and shunt-related surgery were recorded. Reasons for ED revisits were categorized based on whether or not it was related to shunt function concerns. Clinical and socioeconomic factors were analyzed for association with ED revisits.

Results

Of the 1,176 patients discharged home from the ED after shunt function evaluation, 101 returned to ED within 7 days (8.6%). Of the 134 patients admitted by the neurosurgery service for observation only, 8 returned to ED within 7 days of discharge (6.0%). Of the 199 patients admitted to other hospital services besides Neurosurgery, 13 returned to ED within 7 days of discharge (7.5%). The reasons for ED revisits vary (a total of 122 visits combining the 3 groups), but at least 60% of the revisits were clearly not related to shunt function. Younger age, time of arrival during the day, and living within the metropolitan area correlated with increased ED revisits.

Outcome of CSF shunt patients after ED evaluation



Conclusions

Children with CSF shunts are medically complex and utilize ED services often. After an index ED visit where the shunt function was deemed to be the chief concern, the subsequent ED revisit within 7-day is often for complaints unrelated to shunt function.

Multivariate analysis of factors associated with all returns and shunt-related returns to the ED within 7 days (p value and odds ratio).

All return visits (n=122)

Age < 1 year	2.39 (1.44 - 3.96)0.001
Non-English speaking	2.14 (1.23 - 3.73) 0.007
Atlanta metropolitan zip codes	1.69 (1.15 - 2.48)0.007
Time of arrival 7 am to 3 pm	1.56 (1.07 - 2.27)0.021

Shunt-related return visits (n=48)

Age < 1 year	2.41 (1.14 - 5.11)0.021
Time of arrival 7 am to 3 pm	1.90 (1.07 - 3.40)0.030

Learning Objectives

- 1) Describe pattern of ED revisits by patients with CSF shunts.
- 2) Understand common risk factors associated with high frequency ED utilization in this population.

Reference

Akenroye AT, Thurm CW, Neuman MI, et al. Prevalence and predictors of return visits to pediatric emergency departments. *J Hosp Med.* 2014;9(12):779-787.

Cho CS, Shapiro DJ, Cabana MD, et al. A national depiction of children with return visits to the emergency department within 72 hours, 2001-2007. *Pediatr Emerg Care.* 2012;28(7):606-610.

Examples of clinical scenarios encountered at revisits and their adjudication

Revisits that were shunt-related* (n=21)

1. Patient presented with headache at index ED visit but radiographical exam was negative. At revisit, radiographical exam was consistent with shunt malfunction.
2. Patient complained of persistent headache at revisit and was taken for shunt exploration.

Revisits that were not shunt-related* (n=74)

1. Patient presented with headache initially then re-presented with rash, vomiting and diarrhea.
2. Patient revisited for feeding tube related issues.
3. Patient was asked to return when urine culture sent at index ED visit became positive.

Equivocal cases (n=27)

1. Patient with pseudotumor cerebri returned with complains of persistent headache.
2. Patient presented with increased seizure and persistent seizure at index and re- visits.