Novel Criteria System in Triaging Pediatric Foreign Body Aspiration: Chest Diseases Hospital Criteria

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Received: 15 December 2018 Accepted: 3 January 2019 Published: 15 January 2019

Abstract

Adaption of new referral criteria system for suspected pediatrics with foreign body aspiration.Methods: Bronchoscopy reports of all patients referred to Thoracic and foregut surgery unit with suspicion of foreign body aspiration from all Kuwait hospitals during the period from July 2016 to December 2017. Excluded patients who underwent bronchoscopy procedure for diagnostic purposes. Chest diseases Hospital criteria were assigned according to present initially in the emergency room, and the assigned results were blinded from the referring physician. Results:The patients were referred to our care with suspicious of foreign body aspiration from secondary hospitals in Kuwait, totaling 232 patients. Male were 149 patients and females were 83 patients, compromising 64

Index terms—

1 Introduction

oreign body aspiration in the pediatric population is one of the most common presentations to the emergency rooms in Kuwait. More than 400 cases per year visit the ER with suspicion or witness aspiration accompanied by multiple other upper respiratory tract symptoms that may alarm ER physicians to investigate further if there was any history of suspicion of aspiration. Thoracic surgery team in Kuwait get the referral to examine the patient further and perform the bronchoscopy to rule in or out any foreign bodies in the airway. Our team is located in a tertiary care hospital (Chest Diseases Hospital), and we receive patients from different secondary care hospitals as well as private hospitals.

Up until 2016, all referred patients would undergo urgent bronchoscopy regardless of the time of the procedure, thus requiring to call in anesthesia consultant and occupy the operating room for the procedure which is shared with Pediatric Cardiac Surgery team.

This process was found to be a burden as many cases were negative or the patient was stable enough to be referred the next morning when the whole team was available in case a further intervention required.

2 II.

3 Short Review

According to the Centers for Disease Control and Prevention (CDC), an average of 57 deaths among children ages 0 to 14 years due to inhalation and ingestion of food causing obstruction of the respiratory tract occurred each year from 2001 through 2009. 1 Kuwait; unfortunately, a record was not available as there was no registry prior to July 1st, 2016.

The currently available reports show only statistics, but no criteria system was devised to create a triage system to categorized the urgency of bronchoscopy intervention. 2 Although many reports showed large numbered audit studies, no study recommended establishing a proper system for triage and categorization of the referrals.

4 III.

5 The Aim of the Study

To evaluate and assess the validity of Chest Diseases Hospital (CDH) Criteria system for triaging and categorization of the patient suspected with foreign body aspiration.

IV.

6 The Scope of the Study

To utilize the usage of the CDH criteria as a triage system to prioritize the urgency of bronchoscopy and help the utilization of hospital resources.

V.

7 Patients and Methods

The patients were referred from secondary care general hospitals in Kuwait as well as private practice pediatrician and ear, nose, and throat doctors all over Kuwait. The patient history was conveyed over the phone to register the score upon presentation to the referral clinic. The score was reviewed again by the oncall thoracic surgeon with the study team, and the plan of intervention was informed to the treating physician. Any patient who was referred to assess in diagnosing respiratory tract infection or any airway abnormalities were excluded from the study.

8 VI.

9 Study Design

Chest disease criteria were designed according to the previous audit done from 2007 to 2016 of all bronchoscopies performed by the thoracic and foregut surgery unit in Chest Diseases Hospital. The most common presentations associated with positive findings were stratified and weighted to the frequency, they are as follow: Stridor (+3 points), History of chocking (+2 points), Desaturation (below 92%, +2 points), Radiological finding (+1 point), Decreased air entry (+1 point) and respiratory rate (above 30/min, +1 point).

CDH score less than or equal of 3; an intervention was planned to be done within 24-48 hours. If CDH score was between 4 to 6, an intervention was scheduled to be performed within 12 hours. If the score was higher than 6, it was labeled as an emergency and the second on-call was immediately informed, and the bronchoscopy was performed within 3 hours (in some cases the patient was unstable for transfer to our center, so a team would go to the referring hospital to perform bronchoscopy in that hospital).

10 Ethical considerations

All required approval was taken.

11 VII.

12 Results

Two hundred and thirty-two patients were included in the pilot study for Chest Diseases Hospital (CDH) criteria. All of which were presented to our care with evidence or suspicion of foreign body aspiration. Male patients were 149 patients resembling 64%, on the other hand, Female patients were 83 patients and presented with 36%. Mean age of the patients was 36.75 months. Overall, 89 patient was diagnosed and confirmed to have foreign body aspiration by bronchoscopy (38.3%), and 143 patients were negative for foreign body aspiration (61.7%).

CDH scores were clumped according to urgency, a score of 3 and below presented in 158 patients. Out of those patients, negative bronchoscopy was found in 127 patients. Giving us an 80.89% of the patients with CDH of 3 and less are negative. Meanwhile, the positive study was found in 31 patients out of the 157 patients, of which the resemble 19.11% of that category.

CDH score between 4 and 6 presented in 67 patients. The positive studies were presented in 51 patients of the 67 patients, resembling 76.11%. On the other hand, the number of negative bronchoscopies for this category of patients was 16 patients (23.88%).

For CDH scores above 6, seven patients were referred to our service, and all those patients were positive with foreign body aspiration.

Presentation of data CDH 3 and less: positive 31/232 (13.5%). CDH 3 and less: negative 127/232 (54.1%). CDH 4-6: positive 51/232 (22.2%). CDH 4-6: negative 16/232 (6.9%). CDH above 6: positive 7/232 (3%). CDH above 6: negative 0/232 (0%).

13 VIII. Discussion

As the results show, the criteria were tested in controlled environment given the highest priority to the safety of the patients, and the utmost importance was not to jeopardize the health of them. We kept reminding the team

that this scoring system is not to diagnose whether the patient does have a foreign body or not, but it was to decide when to do the bronchoscopy.

Since the initiation of the pilot study, the team resources were conserved in managing more urgent cases (Adult and Pediatric thoracic traumas and emergencies) during on-call duties. The anesthesia, as well as the bronchoscopy room staff, were more available when a CDH score above 6 patient was referred as they now believe it required urgent intervention knowing it was most likely to be a positive study.

The most common foreign body found was organic material (nuts, nut shells, or food) found in more than 75% of the patients with positive foreign bodies. Other foreign bodies were: needles, plastic pen caps, whistles, candies, and chocolate wrapping foil. It was found that whenever the foreign body is present in the main bronchus either right or left, in addition to the trachea, it was associated with higher scores in the criteria system. On the other hand, lower scores and positive studies were associated with foreign bodies being lodged in distal branches of the bronchus.

The study was performed with single blinding factor; we believe that a much larger population would surely validate the study more and help device it into working triaging system and be adopted by centers dealing with foreign body aspiration.

New modalities could be adopted along side of the criteria system to minimize the risk of performing bronchoscopy procedure on younger patients, such modality for example is virtual bronschoscopy (Tomography-generated virtual bronchoscopy) as it was tested on two patients and the authors recommended the performance of conventional bronchoscopy with general anesthesia can be avoided in cases when VB does not show the presence of FB in the airway. 3 Haliloglu et al also domenstrated that when the VB result is normal, without evidence of endobronchial obstruction, the use of conventional bronchoscopy was not superior in providing relevant additional information. 4,5 [1] [2]

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[Haliloglu et al. ()] 'CT virtual bronchoscopy in the evaluation of children with suspected foreign body aspiration'. M Haliloglu , A O Ciftci , A Oto , B Gumus , F C Tanyel , M E Senocak . *Eur J Radiol* 2003. 48 (2) p. .

[Korlacki et al. ()] *Foreign body aspiration in children: diagnostic and therapeutic role of bronchoscopy. Pediatric Surgery International*, W Korlacki , K Korecka , J Dzielicki . 10.1007/s00383-011-2874-8. 2011. 27 p. .

[Underlying cause of death Centers for Disease Control and Prevention. CDC WONDER ()] 'Underlying cause of death'. HTTP://wonder.cdc.gov/ *Centers for Disease Control and Prevention. CDC WONDER* 1999-2009. Accessed November 19. 2012.

[Veras et al. (2009)] 'Use of virtual bronchoscopy in children with suspected foreign body aspiration'. T Veras , N1 , G Hornburg , A M Schner , L A Pinto . 19820821. *J Bras Pneumol* 2009 Sep. 35 (9) p. 41.

[Adaletli et al. ()] 'Utilization of low-dose multi detector CT and virtual bronchoscopy in children with suspected foreign body aspiration'. I Adaletli , S Kurugoglu , S Ulus , H Ozer , M Elicevik , F Kantarci . *Pediatr Radiol* 2007. 37 (1) p. .