Case study

Management Strategies of Acute Bacterial Rhino Sinusitis

ABSTRACT

Aims : The aim of the work is to compare 3 different Guidelines for Management of ABRS and determine the most appropriate Guideline to be adopted by the Egyptian patients.

Methodology : This was a prospective study conducted on 90 consecutive patients selected from the outpatient clinic of Otorhinolaryngology department at Tanta university hospital within the period from December 2019 to December 2020.

Results : the Arabic version of nose scale distribution among studied groups before and after intervention. Before intervention, there were no statistically significant differences among the three studied groups and among each other's ($P>0.05$). After intervention, there were highly statistically significant differences among the three studied groups and each other's ($P<0.001$) being highly decreased in group 2 followed by group A and lastly group C. Paired t test demonstrated highly statistically significant difference before and after intervention in the three studied groups ($P<0.001$).

Conclusion : In conclusion, the current study reported that, the three approaches demonstrated promising outcomes for management of ABRS in terms of SNOT as well as Arabic version of nose scale. However, Epos 2020 Guidelines of ARS were demonstrated to be associated with the most promising ones.

ABBREVIATIONS

ABRS : Acute bacterial rhinosinusitis

A-NOSE : Arabic version of nose scale

ARS : Acute rhinosinusitis

AVRS : Acute viral rhinosinusitis

SNOT-22 : Sino-Nasal Outcome Test 22

NSAIDS : Nonsteroidal anti-inflammatory drugs

INCS : Intranasal corticosteroids

1. Introduction

Rhinosinusitis is defined as symptomatic inflammation of the paranasal sinuses and nasal cavity. The term rhinosinusitis is preferred because sinusitis is almost always accompanied by inflammation of the contiguous nasal mucosa [1, 2].

Acute bacterial rhinosinusitis (ABRS) Acute bacterial rhinosinusitis is suggested by the presence of at least 3 symptoms/signs of [4]:

- Discolored discharge (with unilateral predominance) and purulent secretion in cavum nasi .
- Severe local pain (with unilateral predominance)
- Fever (>38ºC)
- Elevated ESR/CRP
- 'Double sickening' (i.e. a deterioration after an initial milder phase of illness) . (3,4)

This guideline addresses several issues in the management of acute bacterial rhinosinusitis (ABRS), including (I) inability of existing clinical criteria to accurately differentiate bacterial from viral acute rhinosinusitis, leading to excessive and inappropriate antimicrobial therapy; (II) gaps in knowledge and quality evidence regarding empiric antimicrobial therapy for ABRS due to imprecise patient selection criteria; (III) changing prevalence and antimicrobial susceptibility profiles of bacterial isolates associated with ABRS; and (IV) impact of the use of conjugated vaccines for *Streptococcus pneumoniae* on the emergence of nonvaccine serotypes associated with ABRS [5].

2. MATERIALS AND METHODS

This was a prospective study conducted on 90 consecutive patients selected from the outpatient clinic of Otorhinolaryngology department at Tanta university hospital within the period from December 2019 to December 2020.

2.1 The Inclusion Criteria

- Age (16-50) years.
- Presence of at least 3 symptoms/signs of discolored discharge (with unilateral predominance), purulent secretion in cavum nasi.
- Severe local pain (with unilateral predominance).
- Fever (>38ºC).
- Elevated ESR/CRP.
- Double sickening (i.e. deterioration after an initial milder phase of illness).

2.2 Exclusion Criteria

- Any Systemic Disease (DM, HTN, Renal disease).
- Chronic rhinosinusitis with or without nasal polyposis.
- History of Chronic Nasal disease.
- Previously nasal surgery.

- Smokers.

2.3 Methods

1. Complete history taking.
2. Questionnaire to evaluate nasal obstruction symptoms done by Arabic version of nose scale (A-NOSE) .
3. Questionnaire to evaluate Nasal obstruction symptoms done by Arabic version of Sino-Nasal Outcome Test 22 (SNOT-22) Scale.
4. General examination.
5. Otorhinolaryngological clinical examination.
6. Laboratory investigation (CRP, ESR).
7. Patients were randomly included into 3 groups (n=30):
    - **Group 1 (n=30):** Patients with ABRS were treated according To American Guidelines of ARS (6).
    - **Group 2** (**n=30):** Patients with ABRS were treated according To Epos 2020 Guidelines of ARS (7).
    - **Group 3 (n=30):** Patients with ABRS were treated according To Canadian Guidelines of ARS (8,9).

2.4 Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. Qualitative data were described using number and percent. Quantitative data were described using mean, standard deviation for parametric data after testing normality using Kolmogrov-Smirnov test. Significance of the obtained results was judged at the (0.05) level.

3. Results

illustrate the Arabic version of nose scale distribution among studied groups before and after intervention. Before intervention, there were no statistically significant differences among the three studied groups and among each other's (P>0.05). After intervention, there were highly statistically significant differences among the three studied groups and each other's (P<0.001) being highly decreased in group 2 followed by group A and lastly group C. Paired t test demonstrated highly statistically significant difference before and after intervention in the three studied groups (P<0.001). However, the percentage of changes were demonstrated to be insignificant among the three studied groups each other's (P>0.05).

Table (1): Arabic version of nose scale distribution among studied groups before and after intervention:

	Group 1 N=30	Group 2 N=30	Group 3 N=30	test of significance	within group significance
A.nose before mean±SD	18.73±1.26	18.67±1.09	19.0±0.91	F=0.777 P=0.463	P1=0.814 P2=0.349 P3=0.242
A.nose after mean±SD	3.86±0.63	2.93±0.78	5.87±0.89	F=111.02 P<0.001*	P1<0.001* P2<0.001* P3<0.001*
Paired t test	t=73.63 p<0.001*	t=59 p<0.001*	t=114.39 p<0.001*		
% of change	79.4%	84.3%	69.1%		p1=0.624 p2=0.363 p3=0.165

Table (2): Arabic version of Sino-Nasal Outcome Test among studied groups before and after intervention:

	Group 1 N=30	Group 2 N=30	Group 3 N=30	test of significance	within group significance
S.nose before mean±SD	84.67±2.82	82.80±4.98	85.07±2.64	F=3.31 P=0.04*	P1=0.051 P2=0.672 P3=0.018*
S.nose after mean±SD	15.13±1.69	12.60±1.38	17.60±1.43	F=82.45 P=0.001*	P1<0.001* P2<0.001* P3<0.001*
Paired t test	t=114.75 p<0.001*	t=72.99 p<0.001*	t=195.64 p<0.001*		
% of change	82.1%	84.8%	79.3%		p1=0.779 p2=0.787 p3=0.575

4. DISCUSSION

Acute bacterial rhinosinusitis (ABRS) is a highly prevalent disease associated with significant direct and indirect costs. It is paramount that a practitioner can distinguish between acute viral rhinosinusitis and ABRS to avoid unnecessary antibiotic usage. It is also important to understand that establishing a diagnosis of ABRS does not necessitate the prescribing of antibiotics, unless the ABRS patient presents with severe or worsening symptoms or an ABRS complication. Complications include extension of infection to the orbit and central nervous system. Injudicious use of antibiotics imparts societal costs in terms of financial expense as well as contributing to higher levels of bacterial resistance [10].

The aim of the current study was to compare the different Guidelines for management of ABRS and determine the most appropriate Guideline to be adopted by the Egyptian patients.

This was a prospective study conducted on 90 consecutive patients selected from the outpatient clinic of Otorhinolaryngology department at Tanta university hospital

In terms of Epos guidelines, **Hadley et al. (2010)** conducted their study on a total of 118 cases (400 mg of oral moxifloxacin, n = 73; placebo, n = 45 for 5 days). Clinical success rates were numerically higher for moxifloxacin (78.1%, 57/73) versus placebo (66.7%, 30/45); (P = .189). Significantly greater mean reductions in SNOT-16 scores occurred in moxifloxacin- versus placebo-treated patients (-17.54 vs. -12.83; P = .032). Overall concomitant medication use was lower in moxifloxacin versus placebo patients (38.4%, 28/73 vs. 55.6%, 25/45 respectively). Premature discontinuation due to insufficient therapeutic effect was significantly lower in moxifloxacin- versus placebo-treated patients (8.2%, 6/73 vs. 22.2%, 10/45; P = .031). The rate of treatment-emergent adverse events in the ITT population was similar between arms (moxifloxacin 38.2%, 96/251; placebo 40.7%, 50/123) [11]

Concerning American guidelines, the following clinical presentations (any of 3) are recommended for identifying patients with acute bacterial vs viral rhinosinusitis: i. Onset with *persistent* symptoms or signs compatible with acute rhinosinusitis, lasting for ≥10 days without any evidence of clinical improvement (strong, low-moderate); ii. Onset with *severe* symptoms or signs of high fever (≥39°C [102°F]) and purulent nasal discharge or facial pain lasting for at least 3–4 consecutive days at the beginning of illness (strong, low-moderate); or iii. Onset with *worsening* symptoms or signs characterized by the new onset of fever, headache, or increase in nasal discharge following a typical viral upper respiratory infection (URI) that lasted 5–6 days and were initially improving ("double-sickening") (strong, low-moderate) [5].

High-Dose Amoxicillin-Clavulanate recommended during Initial Empiric Antimicrobial Therapy for ABRS. "High-dose" (2 g orally twice daily or 90 mg/kg/day orally twice daily) amoxicillin-clavulanate is recommended for children and adults with ABRS from geographic regions with high endemic rates (≥10%) of invasive penicillin-nonsusceptible (PNS) *S. pneumoniae*, those with severe infection (eg, evidence of systemic toxicity with fever of 39°C [102°F] or higher, and threat of suppurative

complications), attendance at daycare, age <2 or >65 years, recent hospitalization, antibiotic use within the past month, or who are immunocompromised (weak, moderate) [5]

The justification for amoxicillin as first-line therapy for most patients with ABRS relates to its safety, efficacy, low cost, and narrow microbiologic spectrum [1,12, 7]

The Canadian guidelines base severity by the degree to which symptoms impair the patient. Thus, low severity is defined as easily tolerated symptoms, moderate severity reflects steady symptoms that are tolerable, and severe severity indicates that symptoms are difficult to tolerate or interfere with sleep or daily activities. This approach does not depend on the presence of fever, which is not included as a major symptom of ABRS. Symptom severity is then used to determine therapeutic intervention.

According to the general guidelines, amoxicillin remains the first-line choice for ABRS, with trimethoprim/sulfamethoxazole (TMP/SMX) or macrolides recommended for individuals with b-lactam allergy. However, antibiotic choice depends upon other considerations as well, including local antimicrobial resistance patterns, patient risk of resistance, and risk of complications of failure due to underlying disease. For patients with risk of resistance or complications of first-line failure, a second-line agent (amoxicillin/clavulanic acid combinations, fluoroquinolones) is recommended [13]

With regard to Arabic version of nose scale distribution among studied groups, before intervention, there were no statistically significant differences among the three studied groups and among each other's (P>0.05). After intervention, there were highly statistically significant differences among the three studied groups and each other's (P<0.001) being highly decreased in group 2 followed by group 1 and lastly group 3. Paired t test demonstrated highly statistically significant difference before and after intervention in the three studied groups (P<0.001). However, the percentage of changes were demonstrated to be insignificant among the three studied groups each other's (P>0.05).

Regarding Arabic version of Sino-Nasal Outcome Test (SNOT) distribution among studied groups, before intervention, there were no statistically significant differences among the three studied groups and among each other's. After intervention, there were highly statistically significant differences among the three studied groups and each other's (P<0.001) being highly decreased in group 2 followed by group 1 and lastly group 3. Paired t test demonstrated highly statistically significant difference before and after intervention in the three studied groups (P<0.001). However, the percentage of changes were demonstrated to be insignificant among the three studied groups each other's (P>0.05).

It was demonstrate that, SNOT could be used as a helpful tool for quantifying changes in symptoms and, can be used to predict extent of the degree of improvement either following surgical or medical recommended [14].

5. CONCLUSION

In conclusion, the current study reported that, the three approaches demonstrated promising outcomes for management of ABRS in terms of SNOT as well as Arabic version of nose scale. However, Epos 2020 Guidelines of ARS were demonstrated to be associated with the most promising ones.

CONSENT AND ETHICAL APPROVAL

The current work protocol was permitted Tanta Medical research ethics committee, agreement of the directors of the hospitals in which the work was performed, all participants give an agreement to be involved in this work, personal privacy was appreciated in all stages of this work and recorded data will not be employed for any other aim.

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