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Research Article

Comparison of Antibiotics Vs No Antibiotics After Incision and Drainage of Simple Subcutaneous Abscesses in Children

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Abstract

Background: *The skin and soft tissue infections (SSTI) are very common in adult as well as pediatrics population. Among the SSTI, patients with simple subcutaneous abscesses are frequently seen in emergency departments and specially the cases of Methicillin Resistant Staphylococcus Aureus (MRSA) infection are on rise day by day. The mainstream treatment of simple abscesses is incision and drainage, but the use of antibiotics is controversial. According to guidelines antibiotics are recommended only in complicated cases, but the rising number of Community Acquired MRSA infections are causing recurrence of abscesses and treatment failures when no antibiotics are used. Whereas, antibiotics can cause better treatment outcomes, lesser pain and recurrence. But one the other hand, the misuse of antibiotics is a cause of antibiotics resistance and increased monetary burden on hospitals. The aim of our study is to evaluate cure rate and recurrence, after incision and drainage of simple subcutaneous abscesses, in children, with and without use of antibiotics.*

Results: *The patients were divided into two groups. Group A was given antibiotics after incision and drainage of abscesses and Group B was not given antibiotics postoperatively. Total 60 patients were randomized into two groups. There were 37 patients in group A and 23 patients in group B. In group A 97.3%(n=36) were cured and only 2.7%(n=1) had persistence of disease. Recurrence was noted in only 8.8%(n=3) patients and 92% (n=31) patients had no recurrence. In group B all patients were cured. Whereas, recurrence was noted in only 5.6%(n=1) patients. Culture reports showed that MRSA infection was most common (51.8%) and after that, results of staphylococcus aureus species were found on second number (14.3%). All patients having recurrence of disease, were MRSA positive of culture report and post-operative antibiotics had no significant role in prevention of recurrence.*

Conclusion: *Antibiotics are not required after incision and drainage of simple subcutaneous abscesses in order to attain cure and to prevent recurrence of abscesses. Patients having MRSA infection had more chances of recurrence of abscess. Larger randomized control trials are needed for further evaluation.*

Introduction

Skin and soft tissue infections are one of the causes of frequent visits to emergency department (ED). The number of daily visits to ED for abscesses are increasing day by day (1). The emergence of community acquired MRSA (Methicillin Resistant Staphylococcus Aureus) species has caused significant problem and it is considered to be one of the causes of rapid rise in skin and soft tissue infections (SSTI). Among SSTI, simple subcutaneous abscesses are very common in pediatrics population (2) The key treatment of simple subcutaneous abscesses is through incision and drainage (I and D) of pus but the use of antibiotics post-operatively is controversial (3).

Wang W. reported in a meta-analysis, that the use of antibiotics postoperatively, reduced the risk of treatment failure, recurrence at early period of 1 month and late period of 1-3 months, pain and additional surgical procedures (4). However, according to guidelines antibiotics are not considered beneficial after incision and drainage of simple subcutaneous abscesses (5). But the use of antibiotics is not devoid it's harmful effects. Moreover, misuse of antibiotics is a cause of monetary burden on hospitals as well as antibiotics resistance(6,7) there is global threat of ongoing antibiotics resistance and it is causing treatment failures , serious illnesses and a huge cost burden on health system (8). One example of which is development of Methicillin Resistant Staphylococcus Aureus (MRSA) that has increased virulence and common cause of many infections. (9)

The objective of the study is to compare cure rate and recurrence in children undergoing incision and drainage of simple subcutaneous abscesses with and without postoperative antibiotics. We hypothesize that after incision and drainage of simple subcutaneous abscesses, the use of antibiotics and no antibiotics postoperatively, along with wound wash and daily dressings, have similar efficacy for cure of simple subcutaneous abscesses in children.

Patients and Methods

This study was conducted in The Children's Hospital and the University of Child Health, Lahore, from February 2020 to June 2021, after authorization from Ethical Committee of Hospital. Patient's parents/guardians were counseled about detailed explanation of the study, possible postoperative complications and management of complications. All male and female patients from age of 1year to 12

years, who needed incision and drainage for simple subcutaneous abscesses were included in the study. All patients were assessed by history, physical examination and investigations. Patients who had any generalized debilitating disease, malnourished, immunocompromised, diabetic or using steroids, had any systemic illness or more than one abscess on body, who had allergy to routinely used antibiotics, had an area of induration of more than 5cm or had perineal, perianal and paronychial abscesses ,were excluded from study .

Procedure and Data Collection

It was a single blinded randomized control trial and patients were allocated to two groups according to lottery method. Patients were divided into two groups: Antibiotic group **(**group A**)** and No antibiotics group **(**group B**)**. Written informed consent was taken from all patients. Patients in group A were given Amoxicillin clavulanic acid 30-50mg/kg orally, TDS for 3to 5 days after I and D while patients in group B were not given any antibiotic. All the patients in both groups had undergone I and D by same surgical team in a same manner. Under aseptic measures, an incision was given in most dependent area of collection. Pus was drained and wound was washed with normal saline and packing was done with pyodine soaked gauze. Afterwards daily dressing of wound was done .Post-operatively patients were examined for cure and recurrence at 1st, 7th, and 30th post-operative day.

Simple abscess:

Collection of pus that is limited to skin and subcutaneous tissue and not involving deep structures, in an immunocompetent child.

Cure: It means complete resolution of abscess with no need for further drainage and recurrence.

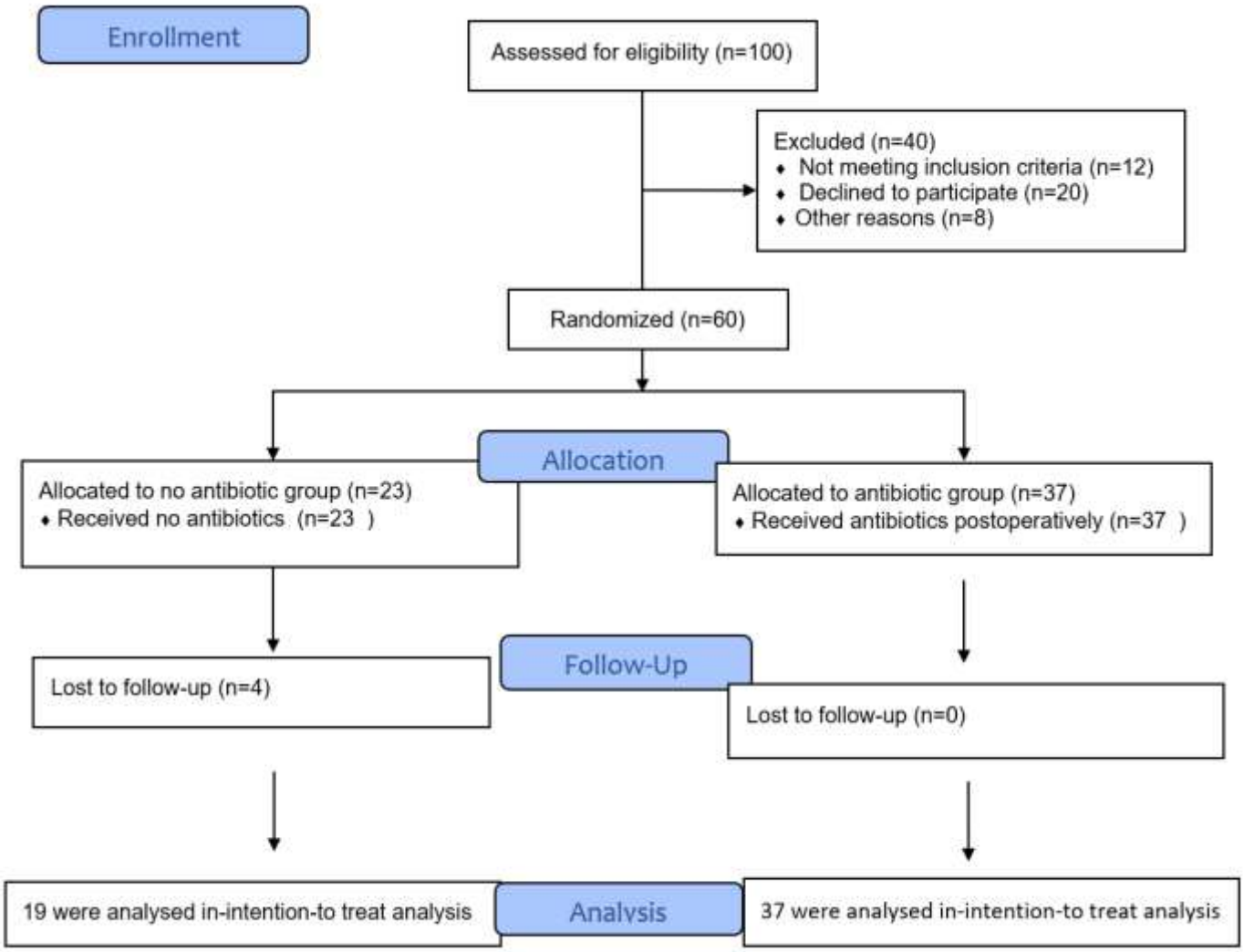
Recurrence: It means that the reaccumulation of collection at same place or some other site requiring drainage or antibiotics.

Data Analysis Procedure

The collected data was entered and analyzed accordingly using SPSS version 22 through its statistical program. Mean ± Standard deviation was calculated for age of the patients.

Stratification for age and gender was done to control the effect modifiers. Post-stratification chi-square test was applied. Qualitative variables like gender and number of patients developing recurrence and cure in both groups were presented as frequency and percentages. P-value ≤ 0.05 was considered as significant.

CONSORT 2010 Flow Diagram



Results

After randomization, 37 patients were allocated to antibiotics group **(**A group**)** and 23 to no antibiotics group **(**group B**)**. Demographics of patients in both groups are described in table 1. Results of cure and recurrence after incision and drainage were recorded in both groups.

In A group, cure was present in 36 **(**97.3%**)** patients and only one patient **(**2.7%**)** had disease persistence **(**table 2**)**. Recurrence was noted in only 3 **(**8.8%**)** patients and 31**(**92%**)** patients had no recurrence **(**table 3**)**. When follow up was done for assessment of recurrence 3 more patients were lost from group A and 1 was lost from group B.

In B group, all patients were cured **(**table 2**)**. Whereas, recurrence was noted in only one **(**5.6%**)** patient **(**table 3**)**.

In both cases, P-value was greater than 0.05 and was not significant.

Table: 1 demographics			
		Antibiotics group	**No antibiotics group**
Age (months; mean (SD))		49.40**(**43.81**)**	32.78**(**32.84**)**
gender	**Female n(%)**	23**(**62.2%**)**	09**(**39.1%**)**
Male;n(%)		14**(**37.8%**)**	14**(**60.8%**)**

Outcome	**Antibiotics group**		**No antibiotics group**		**Relative risk**	**Pearson chi-square test**	**p-value**
	N	**n(%)**	**N**	**n(%)**	**(95%CI)**		
Cured	36	97.3%	19	100%	0.973	0.523	0.47
Disease persists	01	2.7%	0	0			
Lost to follow up	04						
Results of outcome for each group RECURRENCE							
No recurrence	31	91.2%	17	94.4%	0.973	0.117	0.732
recurred	3	8.8%	1	5.6%	1.459		
Lost to follow up	08						

Table : 2+3 Results of outcome for each group of CURE

The pus collected from incision and drainage of abscesses was sent for culture and sensitivity reporting. The most common organism found in pus reports was MRSA **(**51.8%**)** and the second most common organism was staphylococcus aureus **(**14.3%**) (**table:4**)** The MRSA was sensitive to vancomycin, teicoplanin, gentamycin, amikacin and linezolid. Whereas staphylococcus was sensitive to amoxicillin clavulanic acid and above-mentioned drugs sensitive to MRSA as well and it was resistant to penicillin and amoxicillin. Table 5 divided patients in both groups A and B according to result of pus culture reports. Cure and recurrence were again stratified in both groups according to pus culture report **(**table:6**)**

Table: 4 culture report of pus

	Frequency	**Percent**
MRSA	29	51.8%
Staphylococcus aureus	8	14.3%
No organism found	6	10.7%
Pseudomonas species	2	3.6%
Streptococcus species	1	1.8%
Not available	10	17.9%

Table :5 patients in both groups according to culture report

	MRSA		**Staphylococcus aureus**		**No organism found**		**Pseudomonas species**		**Streptococcus species**		**Not available**	
	N	**n(%)**	**N**	**n(%)**	**N**	**n(%)**	**N**	**n(%)**	**N**	**n(%)**	**N**	**n(%)**
Antibiotics	20	54.1%	4	10.8%	4	10.8%	2	5.4%	0	0%	7	18.9%
No antibiotics	9	47.4%	4	21.1%	2	10.5%	0	0.0%	1	5.3%	3	15.8%

Table:6 cure and recurrence among patients with different organisms				
	Cure		**recurrence**	
	cured	**Disease persists**	**No recurrence**	**recurred**
MRSA	28	01	25	4
Staphylococcus aureus	8	0	8	0
No organism found	6	0	6	0
Pseudomonas species	2	0	2	0
Streptococcus species	1	0	1	0
Not available	10	0	10	0

Among the patients who had MRSA positive of culture report, 28 were cured and only 1 patient had persistence of disease. The patient whose disease persisted, was not given post operative antibiotics at start and later on, when initial treatment failed, he was advised antibiotics according to sensitivity. This patient had no recurrence at 30 days after I and D. All the patients with other organisms in pus report, were cured.

The 4 patients who had recurrence, had MRSA positive on culture report, 3 of them belonged to antibiotics group and 1 belonged to no antibiotics group. All four of them were also given antibiotics later on, according to sensitivity report, once initial treatment failed. Thus, our study showed that even in case of MRSA infection, incision and drainage is sufficient for cure of abscesses without any need of post-operative antibiotics. However, recurrence rate was higher in case of MRSA infection but even post-operative antibiotics had no role in prevention of recurrence.

Adverse effects /Harms:

No Adverse effects or Harms were recorded.

Discussion

The diagnosis of subcutaneous abscess is made on clinical evaluation mostly but use of ultrasound in diagnosing abscesses is evolving. it helped in improving the decision of diagnosing abscesses in complicated cases, where clinician was not certain about diagnosis.

Moreover, it helped to find exact location, depth and size of abscess. **(** 10**)**Ultrasound can help in differtiating subcutaneous abscess from cellulitis as the treatment of abscess involves incision and drainage, whereas cellulitis is treated mostly by antibiotics alone**(**11**)** . Moreover, color doppler can be used to assess vascularity around abscess area. **(**12**)**

The standard treatment of skin abscesses is incision and drainage. In our study we have used incision and drainage of abscess .But there is another technique of loop drainage for abscesses that has better results as compared to incision and drainage in terms of short hospital stay, less recurrence and also easy wound care by decreased number of packings . In loop drainage, two small incisions are given at extreme ends of abscess. Pus is drained, cavity is washed and any loculations are broken. After that, a small rubber tube is passed from one end and taken out from the other end and both ends are tied together **(**13**)**. A meta-analysis showed that loop drainage results in less treatment failure than incision and drainage in adults and also in pediatrics population. **(**14**)**

The use of antibiotics post-operatively after incision and drainage of simple abscesses is a controversial topic. Many studies showed that antibiotics after incision and drainage, improved outcome of simple subcutaneous abscess as compared to no antibiotics **(**15,16,17 ,18**)**. A metanalysis showed that antibiotics are associated with improvement in pain control, less recurrence and decreased treatment failure. However, use of antibiotics is not spared of its side effects. **(**4**)**

However, the 2014 Infectious Diseases Society of America **(**IDSA**)** skin and soft tissue infections **(**SSTI**)** guidelines recommended that incision and drainage alone without antibiotics can be good source of resolution of symptoms, for treatment of simple subcutaneous abscesses. **(**19,20 21,22,23,24,**)** Moreover there was no difference in recurrence of abscesses. This is suitable even in presence of MRSA infection and that is comparable to our study as well. **(**19**)** Two old meta-analyses also support same notion **(**1,25**)**.

According to Garcea.G et.al, the most common organism found in pus culture of abscesses was staphylococcus aureus **(**55.9%**)**, the second most common was streptococcal species **(**17.7%**)** and anaerobes **(**17.7%**)** and MRSA was found in only 2.9% of culture reports **(**26**)**. Whereas in our study most common organism found was MRSA **(**51.8%**)** and the second most common organism found was staphylococcus aureus **(**14.3%**)**. In our study most of MRSA found on culture were sensitive to teicoplanin, vancomycin, linezolid, amikacin and gentamycin. whereas staphylococcus organisms were sensitive to co-amoxiclav . These results were comparable with study of Garcea.G.

The incidence of SSTI with MRSA infection is on a rise day by day . MRSA SSTI s are associated with greater risk of recurrence. (27) Our study also showed greater risk of recurrence of abscesses in MRSA infected patients. The mainstream treatment of simple subcutaneous abscesses is incision and drainage (28,29). According to IDSA guidelines, the use of post-operative antibiotics for MRSA infection is only advised under special circumstances like patients having extensive disease, immunocompromised patients, those having systemic illness, etc. (5) Antibiotics for 5 days are enough for simple abscesses. (28)

MRSA infection is commonly treated with trimethoprim sulphamethoxazole (TMP-SMX) and clindamycin. (30) Both these drugs were compared for side effects and showed that clindamycin is associated with high risk of diarrhea whereas TMP-SMX had high risk of nausea . (4)

Conclusion

In patients with simple subcutaneous abscesses, post-operatively after incision and drainage, there was no difference in cure rates and recurrence with and without antibiotics. Larger randomized control trials are required for further evaluation.

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