

Injection Abscesses: Pattern and Presentation in a Semi-Urban Center In Bayelsa State Nigeria

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ABSTRACT

Introduction: The body's response to invasion by a foreign body leads to formation of abscess. Abscesses occur commonly at sites of injection administration such as the buttocks. In our environment due to ignorance and poverty, injections are often administered by untrained and unqualified personnel in unhygienic conditions. We undertook this retrospective study in a semi-urban community to highlight the pattern, presentation, and the menace of untrained individuals in the management of injection abscess.

Method: We retrospectively reviewed one hundred and fifty-five cases of injection abscesses over a ten year period for age, sex, site and type of injection, number of days post injection that the abscess developed, and the person who gave the injection. We used frequencies, means, median and other descriptive statistics to summarize the study population. The student t-test and Chi-Square test were used to analyze the result where necessary, and $p \leq 0.05$ was considered statistically significant.

Results: The age range was three weeks to seventy years, and male: female ratio was 1:2. The gluteal and deltoid regions were the most frequent site of occurrence, but the gluteal region has a statistically significant higher proportion of 79 (51.0%). Most injections were administered by Patent medicine dealers 48 (31.0%), and most abscesses occurred when injections were administered by unqualified personnel. This was statistically significant [χ^2 (p-value) = 103.31 (0.001)]. Injection of chloroquine was responsible for most abscesses 41 (26.45%) and this was statistically significant [χ^2 (p-value) = 64.77 (0.001)]. Staphylococcus aureus was present in 40(64.52%) of cases.

Conclusion: Injection abscesses are common in our environment but can be prevented through training and health education of Paramedicals, Patent medicine dealers and Clients on safe injection techniques.

KEYWORDS: Injection, Abscesses, Unqualified Personnel.

INTRODUCTION

An abscess is a localized collection of pus and infected materials in any part of the body.¹⁻⁴ Whenever a bacterium or other materials enters the body, the body recognizes it as "foreign bodies". As a reaction, the body deploys the white blood cells and other cells in attempt to get rid of the foreign body.^{1,2} The result in collection of pus (which is generally made up of dead tissues, bacteria, and white cells) in and around the foreign body leading to the formation of abscesses. Abscess can occur in any part of the body, but injection abscesses tends to occurs mainly in those areas of the body like the buttock

and the deltoid region were injections are commonly given. Recent studies have indicated that injection related infections, such as abscesses and cellulitis account for the majority of emergency room visits and acute hospitalization especially among local intravenous drug users.¹ Though abscesses are a common consequence of injection use,² the incidence of developing complication from injection in our environment is not known but in the western countries it ranges from 0.4 to 19.3%.⁵ Also in the advanced world injection abscesses are common among intravenous drug

users who self-administer their drugs^{1,2,5,6} often in unhygienic condition and using unsafe injection techniques and practices.

Although Injection abscess is common among drug users sometimes abscesses following injection can occur when drugs are administered to patients even by qualified personnel like the nurses.⁷ Green Blatt⁷ has observed that 46% of all hospitalized patient receives an intramuscular injection during their stay in the hospital. Mclvor et al⁸ stated that Injection abscesses are usually caused by common skin organisms carried from the skin by the needle or seeded hematogenously into the injured tissue or the cytotoxic effect of the drug. The bacterium or foreign body gain entrance to the body through needles piecing the skin and contaminating the injection site.

In our environment as a result of ignorance and poverty, injections are often administered by untrained and unqualified personnel and in unhygienic and dirty conditions. This encourages and precipitates abscess formation. As a result of poor legislation and inadequate drug control institutions, various injectable preparations like Chloroquine injections, vitamin supplements, procaine penicillin and other antibiotics, analgesics like and Analgin (now banned) are often readily available and obtained easily by the patent medicine dealers and other unqualified personnel. Based on ignorance and poverty, patients often patronize the patent medicine dealers and other unqualified persons.

Abscesses often develop as a result of administering these drugs, and as a result of inadequate training, they may push dirt and bacteria into the tissue when injecting. These same untrained individuals are likely to use multi-dose containers that are contaminated by bacteria and dirt, and they may use these same needles more than once. A few days after the injection, the patient will present with excruciating pain, swelling, fever, chills and constitutional symptoms like nausea and vomiting. The injected site and surrounding skin may become red, swollen and tender. There may be loss of function, warmth, and indurations of the affected area.

The abscess may burst through the skin issuing pus and infected materials.

Brinswanger et al, and LIero JL et al^{9,10}, in their studies stated that injection abscesses are variable in their presenting signs and symptoms, but significant finding includes preexisting cellulitis, skin changes which usually develops 2-10 days after the injection⁹ and majority of these abscesses are red, swollen, tender, fluctuant or erythamous with indurations.¹⁰

Antibiotic alone will not usually cure an abscess.¹⁻³ It must be opened and drained. However, incision and drainage are not indicated for cutaneous cellulitis without an underlying abscess. Empirical antibiotic are indicated for patient who develop cellulitis after injection.^{5,6,10-14} Crippling and disabling complications

like osteomyelitis, gangrene, ulcers, keloid and hyperpigmentation have been known to occur following injection.^{13,14} Paralysis of the lower limb from puncture and infiltration of the sciatic nerve by drugs, fatal gas gangrene and quadriceps myofibrosis as observed by Beecroft PC et al¹³ and VonHook R et al,¹⁴ have resulted from injecting drugs into the gluteal region.

This paper is aimed at drawing attention (public health department) to the menace caused by the administration of injections by unqualified and untrained individuals who indulge in the act of giving injections to the unsuspecting victims. Such individuals are known to administer injection in dirty environment.

Despite its importance, prevalence and morbidity, no study has been performed on the pattern of presentation and the drugs causing injection abscesses in this environment. This retrospective study is aimed at evaluating the pattern of presentation and the common drugs causing injection abscesses in a semi-urban set up.

PATIENTS AND METHODS

One hundred and seventy-three cases of injection abscesses in a ten years period between January 2005 to December 2015 were reviewed. There cases notes were reviewed for age, sex, site of injection, type of injection, number of days that the abscess developed after injection, and the person who gave the injection was noted. Treatment received complications and the outcome of treatment. All abscesses arising from puncture wounds, burns and trauma were excluded from the study. Patients with intra-abdominal and pelvic abscesses and abscesses following insulin injections in diabetic and other co-morbid disease like anaemia, jaundice, malignancy and those on immunosuppressant were excluded from the study. We used frequencies, means median, and other descriptive statistics to summarize the study population. The student chi test was used to analyze the result where necessary.

RESULTS

There were 48 males and 107 females, given a ratio of 1:2.2, and their ages ranged between three weeks to seventy years. The youngest was a three weeks old patient who developed abscesses in the gluteal and deltoid region following immunization, while the eldest was a seventy year old lady who received an unknown medication from a patent medicine dealer for an none specific body pains. Children and young adult females were more commonly involved.

The gluteal and deltoid regions were the most frequent site of injection abscesses. Four patients had injections at the dorsum of their foot while three had abscesses at their elbow regions following an injection of an unknown medication by a patent medicine dealer.

Patent medicine dealers, community health officers, hospital maids, retired soldiers, teachers and administrators

injections to patients. Most abscesses occurred when injections were administered by unqualified personnel especially the patent medical dealers. Only 15 cases occurred when the drugs were administered by either a doctor or a nurse.

Onset of symptoms/abscess seem to be highest between 6-10 days and this statistically significant(χ^2 (p-value =

121.33(0.001). this was followed by between 11-15 days, 30 (19.35%) and 1-5 days, 27(17.42%).

Injection chloroquine was responsible for most injection abscesses, this is followed by Novalgin / Analgin (now banned). The least injection causing abscess was tetanus toxoid. 12 patients do not know the type of injection they were given.

Table 1: Age Sex distribution

S/No	Age range (yrs)	Male	Female	Chi-square (χ^2) (p-value)
1	0-10	19	32	1.78 (0.939)
2	11-20	10	24	
3	21-30	6	19	
4	31-40	5	12	
5	41-50	3	8	
6	51-60	4	7	
7	61-70	2	5	
Total		48	107	

Table 2: Anatomic site of injection abscess

S/No	Site of Injection abscess	Male	Female	Total (%)	Chi-square (χ^2) (p-value)
1	Gluteal region	22	57	79(51.0)	256.64 (0.001)*
2	Deltoid	12	30	42(27.1)	
3	Upper arm	6	6	12(7.74)	
4	Thigh	3	7	10(6.45)	
5	Elbow/Axilla	1	5	6(3.9)	
6	Dorsum of foot	3	0	3(1.94)	
7	Calf	1	2	3(1.94)	
Total		48	107	155(100)	

*Statistically significant (p<0.05)

Table 3: Injection administered by

S/No	Administrator of injection	Freq (%)	Chi-square (χ^2) (p-value)
1	Chemist/patent medicine dealers	48 (31.0)	103.31 (0.001)*
2	Community health attendants	28 (18.1)	
3	Auxiliary nurse	22 (14.0)	
4	Hospital maids/cleaners	12 (7.74)	
5	Nurses	11 (7.10)	
6	Retired soldiers	7 (4.52)	
7	Teachers	5 (3.23)	
8	Doctors	4 (2.58)	
9	Others (unspecified.)	18 (11.61)	
Total		155 (100.00)	

*Statistically significant (p<0.05)

Table 4: Number of days after injection before onset of symptoms/abscess

S/No	Days	Male	Female	Total (%)	Chi-square (χ^2) (p-value)
1	1-5	8	19	27(17.42)	121.33 (0.001)*
2	6-10	18	42	60(38.71)	
3	11-15	11	19	30(19.35)	
4	16-20	7	12	19 (12.26)	
5	21-25	3	7	10 (6.45)	
6	26-30	0	6	6 (3.90)	
7	>30	1	2	3 (1.94)	
Total		48	107	155(100)	

*Statistically significant (p<0.05)

Table 5: Type of injections received by patients

S/No	Type of injections received by patients	Freq (%)	Chi-square (χ ²) (p-value)
1	Chloroquine	41(26.45)	64.77 (0.001)*
2	Novalgin/analgin	25(16.13)	
3	Vitamin k	20(12.90)	
4	Antibiotics-ampiclox/gentamicin	19(12.26)	
5	Immunization	15 (9.68)	
6	Vitamin B complex	11 (7.10)	
7	Paracetamol	10 (6.45)	
8	Tetanus toxoid	2 (1.30)	
9	Unknown injection/ medication	12 (7.74)	
	Total	155 (100.0)	

*Statistically significant (p<0.05)

Table 6: Clinical features/Presentation

S/No	Clinical futures/Presentation	%
1	Pains.	100
2	Swelling	100
3	Limitation of movement	75
4	Fever.	45
5	Fluctuant selling	40
6	Induration	30
7	Erythema	20
8	Nausea	10
9	Vomiting	10
10	Chills	5
11	Pus draining through a sinus	3
12	Multiple abscesses.	3

Table 7: Bacteriology.

S/No	Organism	Freq (%)
1	Staphylococcus aureus	40 (64.52)
2	Proteus species	7 (11.30)
3	Klebsiella species	6 (9.70)
4	Staphylococcus albicans	4 (6.45)
5	Streptococcus viridians	4 (6.45)
6	Escherichia coli	3 (4.84)
7	Salmonella species	2(3.23)
8	Pseudomonas	2(3.23)
9	Candida albicans	5 (8.10)
10	No growth	10 (16.13)

The most common clinical futures of patient with injection abscess were pain and swelling, followed by limitation of movement of the affected site. Few patients had discharging sinus. Only three patients had multiple

injection abscesses at the gluteal region. In our 155 patients, 62 (40%) had recorded bacteriologic culture and sensitivity report. Staphylococcus aureus was present in 40 (64.52%) of cases. There were polymicrobial (mixed bacteria) growth in 12 (19.35%). No growth was seen in 10 cases (16.13%), and in addition, 5 grew fungal flora. Stapylococcus aeures, sreptococcus species, Escherichia coli, protues mirabilis and klebsiella species are the most common pathogen and they grew more among those who had gluteal abscesses. No anaerobic culture was done. Resistance to penincillin- 100%, ampicillin. 98.8%, Septrin 100%. Sensitive to amoxicillin/clavulamic acid, ciproflaxacillin

Antibiotics and analgesics were the most common form of treatment received by the patients. Ten patients had tetanus toxoid administered. Incision and drainage was the most common form of surgical procedure patients received. Few abscesses were aspirated by the attending physicians.

Four patients who had gluteal abscesses needed a second drainage procedure. Out of them, two were diabetics, while the rest was receiving immunosuppressant drugs. Four patient who had perianal and gluteal abscesses were admitted. The rest were treated as outpatient.

The most common complication seen was injury to the sciatic nerve which was mild and transient. This was seen in twelve patients. Osteomyelitis occurred in three children,

Table 8: Sensitivity pattern.

Organisms	Staph. aureus	Staph. Epidermidis	Klebs spp	E.coli	Proteus spp	Pseudo monas	Streptoc. spp	Salmonella
Antibiotics								
Penicillin	0	0	0	0	0	0	0	0
Septrin	0	0	0	0	0	0	0	0
Ampicillin	0	0	0	0	0	0	0	0
Tetracycline	97	97	88	88	81	81	81	48
Chloramphenicol	32	NT	NT	40	81	40	81	100
Erythromycin	77.4	77.4	70	70	70	81	97	81
Cloxacillin	32	39	40	48	48	48	40	81
Gentamycin	100	100	100	100	100	81	81	100
Cephalosporin	100	100	100	100	100	100	100	100
Cephelexin	100	100	100	100	100	100	100	100

Table 9: Treatment received

S/No	Treatment	%
1	Analgesics.	100
2	Antibiotics	98
3	Tetanus toxoid	5
4	Aspiration	0.5
5	Incision and drainage	86
6	Unspecific	2

Table 10: Complications

S/No	Complications(n=28)	F (%)
1	Osteomyelitis	3 (1.95)
2	Trauma to sciatic nerve	12(7.8)
3	Sinus formation	4 (2.6)
4	Gluteal ulcers	3 (1.95)
5	Hyperpigmentation	6 (3.9)

DISCUSSION

Skin and soft tissue infection including cutaneous abscesses, are commonly encountered among patients presenting for treatment in the emergency department.^{1,2,15} Though the incidence of injection abscess is not known, injection abscess is a common in clinical practice especially among drug users.¹⁻³

In our study, more children and females were affected than males in the ratio of 2.2:1. This seems to suggest that children and females tends to seek more medical attention than their males counterpart, and may also suggest that females may demand more injection for their condition than their male counterpart.

Although no part of the body is immune to cutaneous abscess, however, Injection abscess occurs mainly at those parts of the body, where intramuscular injections are frequently and commonly given. The classical site for giving injections is at the upper outer quadrant region of the gluteal region and in the deltoid region of the arm. This could explain the high incidence of abscesses in both the gluteal and deltoid regions of the arm in our studies. Edino et al¹⁶ while working on the management of acute abscesses in Jos, Nigeria, had observed that 22.5% in their series had gluteal abscess that followed intramuscular injections. This finding is also in agreement with those of our study.

People who are immune compromised, for example those on chronic steroid therapy, chemotherapy, diabetic, those who have HIV/AIDS and predisposing factors like anemia, obesity overweight among others are more likely to develop abscesses following injection.⁵

Though this is true, our study was not designed to determine predisposing factor like diabetes mellitus or capture those who may be immune compromised. However, cutaneous abscesses tends to be commoner among those who are immune compromised.⁵

Abscesses following an injection usually begin to develop 2-10 days after receiving the injection, and they slowly grows in size, causing increasing discomfort over

the following weeks.⁶ As a result of the bulk of muscles in the gluteal region, abscesses in this area continue to grow for many weeks eventually reaching a big size. Dudley et al⁶, believe that injection abscess tends to develop slowly because they start as an area of necrosis than as a virulent infection. In our report, the highest incidence (38.7%) of abscesses occurred between the 6-10 days after patient receiving the injection. This result is in agreement with the work of Dudley et al⁶ that some patients presented with abscess over three weeks after receiving the injection is also in support with the work of Dubley et al⁶ and Edino et al.¹⁶ Dudley et al⁶ believes that following an injection, an abscess develops gradually to form an indurated mass which eventually form an abscess over a period of a weeks. This can explain the late/lag/delayed period for presentation of some of the patients in our study.

In our environment, the people believe that injections, either intravenous or intramuscular are superior to oral medications. As a result, those who have normal oral routes and no contraindication are often given intramuscular injections based on their demand by the patent medicine dealers. Our report showed that chloroquine injection (26.45%) followed by analgesics (16.13%) had the highest number of associated injection abscess. This is not surprising because, we are in malaria endemic zone, any febrile ailment is ascribed to be malaria. This could explain the high incidence of chloroquine and Analgin (Banned) being the leading drugs causing injection abscesses in this environment.

Cutaneous abscesses frequently occur as a complication of intravenous drug users in advanced societies.^{1,2} They commonly result from the use of non-sterile solution in which the drugs are dissolved or from lubrication of the needle using saliva.^{2,9,17} Although not captured in our study, the reason for the high rate of injection abscesses occurring after administration of injections by patent medicine dealers and other untrained persons might not be different.

The patent medicine dealers may indulge in the use of non-sterile solution, contamination of multi-dose vial by bacteria, couple with poor hygienic conditions may be responsible for the high frequency of injection abscesses resulting from injections administered by the patent medicine dealers and other non-medical staffs. Also the reuse of needles by drug addicts and untrained medical personnel may be contributing factor, but our study was not designed to determine these factors.¹⁷ However, Edino et al¹⁶ believes that failure to observe aseptic technique were probable the cause of increase number of gluteal abscesses.

Rossi and Conen⁴ have described multiple abscesses arising from intramuscular injection. Although, statistically not significant, four patient in our series had multiple abscesses following injection. These were patients who had multiple injection therapy following

febrile condition. The use of multiple bacterial contaminated vials and the reuse of needles by the unqualified personnel may explain the occurrence of multiple abscesses in these patients.

The number of cases having a recordable bacteriology report was 40% in our study. This figure is low compared to the report by Treadwell et al.¹² Poor documentation, inadequate record keeping and patients' failure to carry out the requested test by the attending physician due to ignorance and poverty may account for this low figure.

Many abscesses are caused by staphylococcus aureus alone, but they can be caused by mixed infection.¹⁶⁻²³ Our study revealed that staphylococcus (64.52%) alone was responsible for most of the abscess, while 19.35% of cases grew multi bacterial strains. Though our figure was slightly lower than those of Haqqi I et al⁵ who studied only intramuscular abscesses in patients, but it is in keeping with the study done in other centers.^{6,19-22} The abuse and indiscriminate use of antibiotics in our environment due to availability may account for the high incidence (16.13%) of no growth of bacteria in our study. Our figure 16.13% is similar to those of Edino et al¹⁶ (10%) who studies acute abscesses in Jos, Nigeria.

Injection abscesses due to infection by atypical mycobacterium are known to occur following tattooing, injections vaccinations and implants.²¹ Atypical mycobacterium are opportunistic pathogens occurring freely in nature, usually cause of localized disease in the immune competent and disseminated infection in immunocompromised.²¹

In our study, important factors like diabetes mellitus, weight of the patient, anemia, and malignancies which may predispose patient to injection abscesses as was done by Haqqi I et al⁵ was not determined. This and the fact that no laboratory test and ultrasound scan was carried out to confirm the diagnosis of abscesses are some of the limitations of the study.

Incision and drainage are not indicated for cutaneous cellulitis without an underlying abscess¹⁵ however, various treatment modalities including incision and drainage, curettage, and primary closure, aspiration of the abscess with injection of antibiotics into the cavity has been advocated for the treatment of abscesses.³

In 1951 Maurice Ellis¹⁸ suggested that abscesses could be closed at the time of incision and drainage. This view was supported by others.²⁰ But in our series, the abscesses were incised and drained without primary closure with good result. In addition, antibiotic was given to the patients with good result. Although, incision and drainage constitutes the primary therapy for the management of cutaneous abscess including those caused by injection,¹⁰ the use of antibiotic alone is inadequate for treating many localized collections of infectious materials, therefore, the abscess must be incised and drained in addition to the use of antibiotics.

It is important to note that outbreak of injection abscesses due to contamination of material injected or the use of unlicensed drugs are known to occur.²¹ and that the act of giving injection is not a benign procedure. It has with it the risk of disease, disability and even death.

An important preventive measure is to educate client about safe injecting methods, proper injecting techniques and care in selecting of injecting sites¹⁹ and that wounds and abscesses can potentially be avoided by using safer injection techniques.¹⁷

Though, serious complication like amputation of the limb following injection, septicemia, gas gangrene, muscle fibrosis with contracture of the joint, myofibrosis and paralysis traceable to injection administration was not recorded in our series, some of these may have been missed by the patient who may have attributed the injection to cure rather than the cause of the diseases.

It is important to educate the population about the dangers associated with injection. The belief in our society that injections are superior to oral medications must be corrected by public health personnel's through advocacy, education and creating awareness in our communities through the mass media. This is a legal issue and a serious public health challenge which must be addressed.

CONCLUSION

Injection abscesses are common in our society, and great number of these is caused by the administration of injections to patients individuals who are untrained.

Injection abscesses are preventable, treatable and manageable with proper training of the patent medicine dealers and other paramedical staffs on the technique of safe injection. An important preventive measure is to educate clients about safe injection, proper injecting technique and the care in selecting injection sites. There is a need to establish reliable protocols for the administrations of safe and effective intramuscular injections.

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