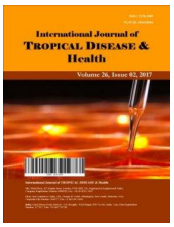

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Pyo-adipocytolytic –Necrolysis Subcutis and Pan-necrotizing Subcutis: Unusual Dermato-Pathological Entities, Complications of Injection Abscess Given by Unskilled Personnels- Management and Outcome

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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Case Study

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ABSTRACT

Injection abscess are becoming common complications seen in sub-Saharan Africa. The abscess may further become a root for unusual dermato-pathological clinical findings when they are not initially managed properly. Pyo-adipocytolytic-necrolysis subcutis and Pan-necrotizing subcutis were unusual subcutaneous pathologies that emanate from unsafe injections in the clinical reported cases seen in a child and a 3rd trimester pregnant woman. The terms describes the extensive complications arising from extension of injection abscess, as a result of inoculation of antibiotics low sensitive and resistant Staphylococcus sp and Proteus sp during intramuscular injections. Catalyst to the pathogenesis including lack of handwashing, lack of swabbing of injection site with antiseptics before procedure, poorly selected anatomical locations, reusing unclean disposable gloves. The retrospective review revealed some observational finding that affirm the

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pathological terms which can be used by clinicians to identify these entities such as adipocytolysis, abscess local invasiveness, distant metastasis of necrolysis and recurring pathology from site of injection abscess, Pan-Adipo necrolysis of the subcutaneous layer. The presence of these entities usually occur on background of immunosuppression as in pregnancy and in severe acute malnutrition as seen in the reviewed cases. Their prognosis is favorable when adequate and high quality nutrients are available, aseptic incision and drainage, highly sensitive and specific antibiotics, protocols for injection are duly followed and psychosocial support is available.

Keywords: Injection abscess; Pyo- adipocytolytic -necrolysis subcutis; Pan-necrotizing subcutis.

1. INTRODUCTION

The complication of injection sites are numerous to mention [1] and have been reported from several outlets of healthcare and at several levels of health care, both trained and untrained health personnel. Injection site abscess is one of such complications and defined as a localized soft tissue collection of materials occurring at the site of immunization or parenteral administration of drugs. It may further be complicated into these pathologies described in this article. Injection abscess may further be divided into two case definitions [2]; which are sterile abscess and Abscess of infectious etiology. The skills necessary for safe injection administration especially subcutaneous, intradermal and intramuscular routes have been undermined by many people in health practice. The need to highlights and discuss the importance of safe injections and administration following the unusually dermatological pathological subcutaneous entities seen in the reported cases. The article intends to elaborate on the feature of the unusual entities, aetiopathogenesis, pathologic Processes, management and outcome.

2. MATERIALS AND METHODS

The study was a pro-active and retrospective review of dermatological findings in two clinical cases admitted into the Biu General Hospital, located in North-Eastern Nigeria. North-East of Nigeria had been ravaged by insurgency and currently is in the rehabilitation stage. International health Non-governmental organizations and governmental agency are currently all over the region providing support and health care directly or indirectly through the local hospitals where available and safe. Also some literature review was carried out to ascertain any close relative findings using international reputable journals and publication.

3. RESULTS

The report highlights clinical presentation, physical findings, pathological findings and pictures of these cases that were reviewed.

3.1 Case Report 1

A 2 and half year old female child presented by her mother with history of fever following swollen buttocks with right gluteal ulcer following injection given at hospital in a undeveloped community. She had abscess in one of the buttocks which ulcerated to a wide open wound. She was referred to our secondary health center for expert care. She was very febrile, dehydrated, and anemic.

Her heart rate was 136 beats per minute, tachypneic with respiratory rate of 40 cycles per minute, weight was 8.5 kg, 65 percent of expected, complete neck stiffness, after few days in the ward, She was edematous with complete neck stiffness, unconscious with Glaxo coma scale of 5/15. Provisional care as a case of cerebrospinal meningitis with ulcerated injection abscess was established.

Further examination after few days of in hospital care, with wound dressings. Her thighs, arms shoulders, and calf's were notably fluctuant, swollen, bilateral asymmetry in diameters in both upper and lower limbs were noticed. She was unconscious and very febrile at temp of 38.8. A case of overwhelming sepsis in shock with Pyo-subcutis on back ground of suspected (Cerebro Spinal Meningitis) CSM and poorly managed injection abscess.

A deeper palpations of the limbs showed subcutaneous noddles flocculate. Skin surfaces appeared reddish brown with shinny surface and tensed limited only at flexural surfaces, other part of the body or limbs showed floating nodularity beneath the skin surface. A longitudinal Incision,

drainage and irrigation with aseptic solution was carried out on different parts of the lower limbs. The medial aspects of both thighs foremost followed by posterior aspect of both calves, then ischial region of left buttock (Fig. 3). A transverse incision was also carried out in the upper third portions of both left and right arms (Fig. 5). Blunt dissection beneath the skin was carried out to explore and open loculi of cavities with pus collections. Abscesses collections contained caseation adipocytic globes (Fig. 1) of subcutaneous tissue floating in necrotic pus (Fig. 2). Some fluid were almost completely white with oily texture (Fig. 4). The above description highlights rare entity Pyo-adipo-necrolysis subcutis in the pathological description macroscopically and when this entity involves almost the entire skin of the body, it should be termed pan-necrotizing subcutis (Fig. 2). A further gentle palpation of the under surface of the dermis showed island of fat tissue as well as overlying the surfaces of the fascia and underneath separated dermis was seen after incision. This was a confirmation that the necrosis was taking place within the subcutaneous layer, creating complete detachment of the skin from the fascia notably adipocytolysis and Pan-necrotizing subcutis involving limbs and gluteal regions, thigh and legs. Incisional wounds were left open to allow for continuous drainage of residual pus including disintegrated of necrosis island of fat nodule and slough removal, then wound were stitched and dressed with iodine after it was slowly granulating overlying the fascia and underneath the skin, those of the arm were left for healing primarily.

Ancillary investigation showed pre-transfusion pack cell volume of 22 percent, Hemoglobin concentration of 6.6 g/dl, Erythrocyte sedimentation rate of 104 mm/hr, White blood cell 5.1 $X10^9$cells/ul, differential WBC percentages showed Neutrophil 51%, lymphocyte 47%, monocyte and eosinophil 1% each. Blood film appearance showed moderate Rouleau formation and anisocytosis with hypochromasia. HIV serology was negative. Sample analysis with microscopy culture and sensitivity showed staphylococci sp and Proteus sp, mildly sensitive to Amoxicillin and Clavulanate while moderate or highly sensitive to Penicillin, Gentamycin, Ofloxacin, Perfloxacin, Trimethoprim/ sulfamethoxazole and Streptomycin but resistant to Cephalexin and Nilidixic acid. Other investigations requested were serum albumin and total protein.

She was resuscitated with fluids; 4.3% dextrose saline, blood transfusion of 200 mls, intravenous furosemide for marked edema. Thereafter place on tetanus toxoid and anti-tetanus serum, oral syrup antibiotic; Metronidazole and Amoxicillin and clavulanate, while patient did not improve. The replacement was intravenous gentamycine and ciprofloxacin according to sensitivity results. Addressing the Severe acute malnutrition (SAM). she was also resuscitated with half strength Darrow's solution due to lack of Resomal solution, thereafter was feed via NG tube with F 75 for three days, thereafter she was placed on F-100 as tolerance improved while weight was monitored. She had 5 courses of 100-150 mills of serum albumin from universal donated Blood. Subsequent there was top-up of freash whole blood, about 100-200 mills over 2 months period. Temperature was erratic but later stabilizes as infection and Pyo-adipo-subcutis dried up. Child also had mineral rich high calorie diet and drinks, blood tonics, vitamin C, and Zinc tablets for building the body. Psychological support was performed by mother and one of her siblings (sister) around playing with her and giving her facial make-overs.

3.2 Case Report 2

A second case is a rare complication from abscess formation following injection abscess by an untrained unskilled personnel; a report of a 35 year old pregnant woman in a latter phase of her third trimester pregnancy. She had so much fat in the gluteal region. She had injection abscess and was dressed at a local setting. The surface metamorphosed into a necrotic scab, and mother was presented to our facility. On examination, it was an necrotic scab tissue covering more than half of the gluteus with underlying injection abscess. After removal of the necrotic scab, a large ulcer emerge with everted and undermined edge. The floor was filled with islands of necrotic adipose lobules and nodules, with complete paleness and slough of decomposing fluid of adipose and oil. Ulcer Size was measured to reach 45 centimeters. Wound Base was a firm deed necrotic pale non-contracting muscle tissue with gray color of gluteus medius and minimus and other small muscles seen were piriformis, superior and inferior gemelli as well as obturator muscles. Systematic serial debridement was done with analgesia. General Anesthesia was avoided so as not to affect the unborn baby. After about 3 weeks, her cervix was ripened and labor induced while having sepsis (fever) and delivered a live healthy female baby but neonate was

placed on oral antibiotic Prophylactically. Continuous debridement was carried out until granulation tissue was depositing and gentle dressing continued until would contracted. She stayed about 4 months on admission.

Fig. 1. Necrotic infected fat lobule: from pan necrolyzing Subcutis of the body skin. Retrieved from the pus of the gluteal fold the child

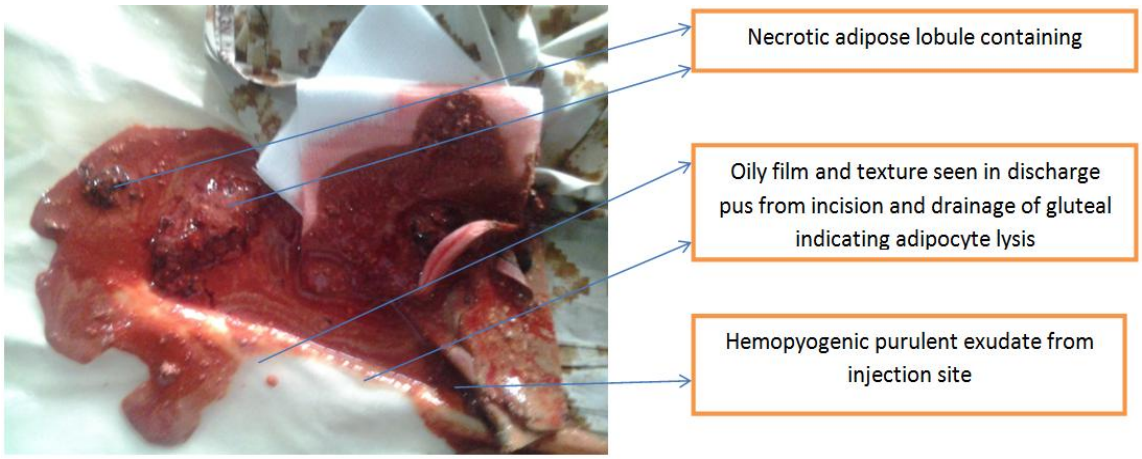

Fig. 2. Exudates from left thigh after notice of fluctuancy

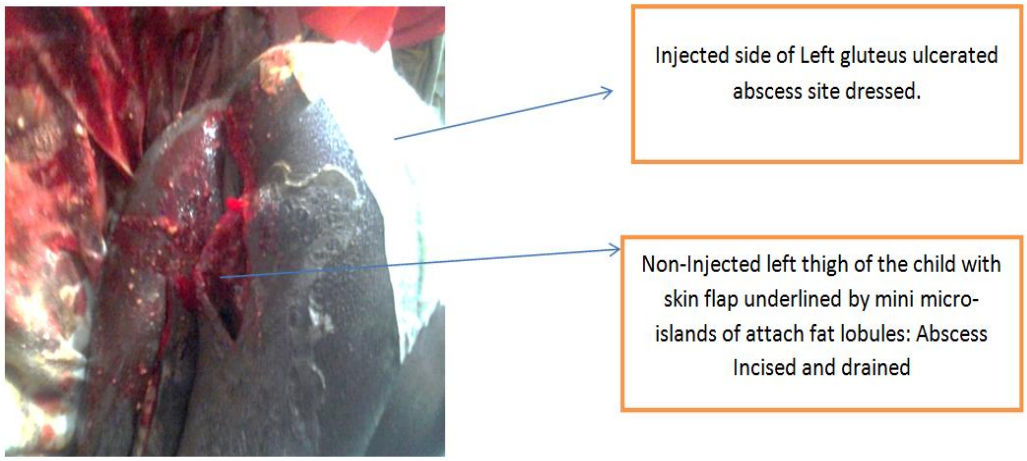

Fig. 3. One of the 6 Un-injected sites in Pan-Necrotizing subcutis in under-5 year old

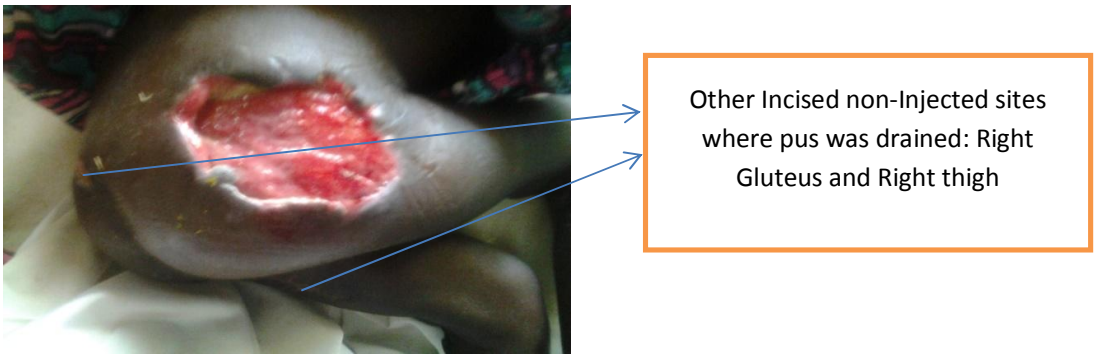

Fig. 4. Injection abscess ulcer of left Gluteus Healing with granulation tissue and few sloughs and other abscess sites

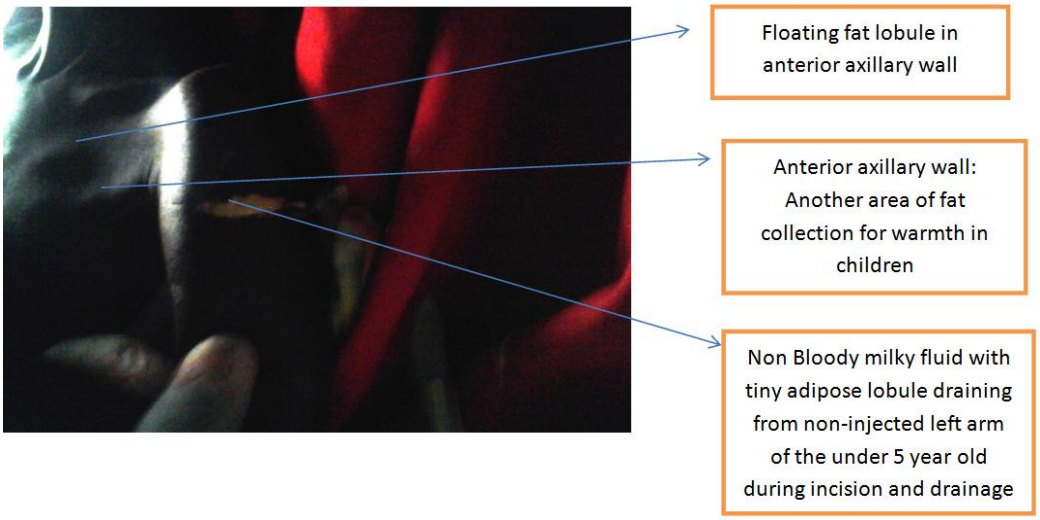

Fig. 5A. Incision and drainage of the left Arm from Distant occurring necrosis away from gluteal injection abscess

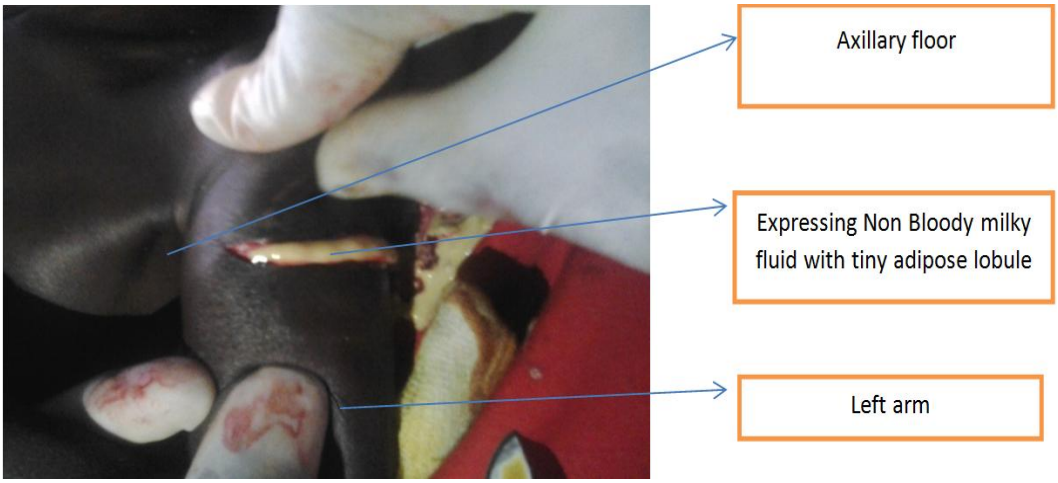

Fig. 5B. Incision and drainage of Pyogenic adipocytolytic necrotic exudate from the left Arm

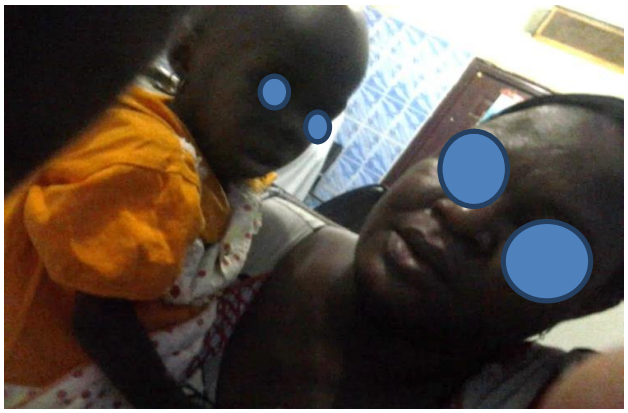

Fig. 6. Recovered child after long term management and nutritional rehabilitation

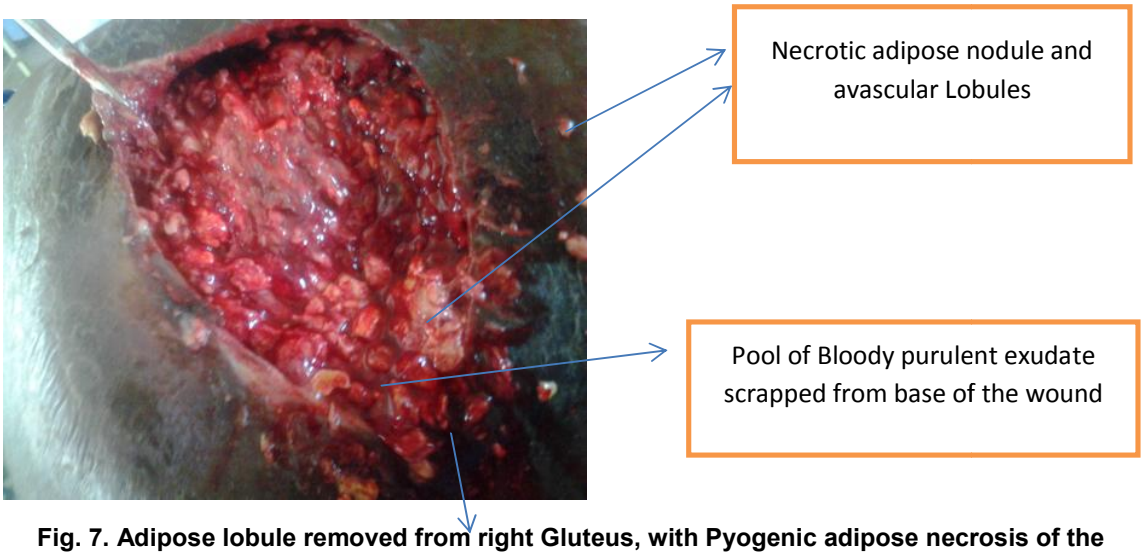

Fig. 7. Adipose lobule removed from right Gluteus, with Pyogenic adipose necrosis of the subcutis with oil texture (adipocytolysis) mixed with blood during debridement

4. DISCUSSION

The clinico-pathological entity of these dermatological findings involves majorly the subcutaneous layer as depicted in Figs. 3, 8, 9, & 13. In case 1, the affected areas were the adipose pads of the under-5 year old child which makes up the body weight, body shape and add support on the lower limbs, consequentially the pathology was seen only in the areas with adipose deposited. Pyo-adipo-necrolysis subcutis or Pyo- adipocytolytic -necrolysis subcutisis a term that can describes the pathology observed in most of these areas involved in case 1.The components observed were adipocytes lysis, avascularity, breakdown of elastic and collagen fiber in the subcutaneous layer, detachment of adipose lobule from overlying dermis and underlying fascia and presence of dead inflammatory blood cells, tissue debris, living or dead organism in exudate which characterize most pyogenic pathologies [3].

Other reports have shown that Subcutaneous adipose necrosis occurs in newborn, and uncommonly characterized by firm, mobile, erythematous nodules and plaques over the trunk, arms, buttocks, thighs, and cheeks of full-term newborns [4,5], still affirming that it involves areas of adipose pad and deposit in the body and may runs a self-limited course, but it may be complicated by hypercalcemia and other metabolic abnormalities [4,5]. However, in case report 1, the condition destabilized the child health accounting for long stay in hospital, loss of childhood developmental milestones and severe acute malnutrition noticeable in the child.

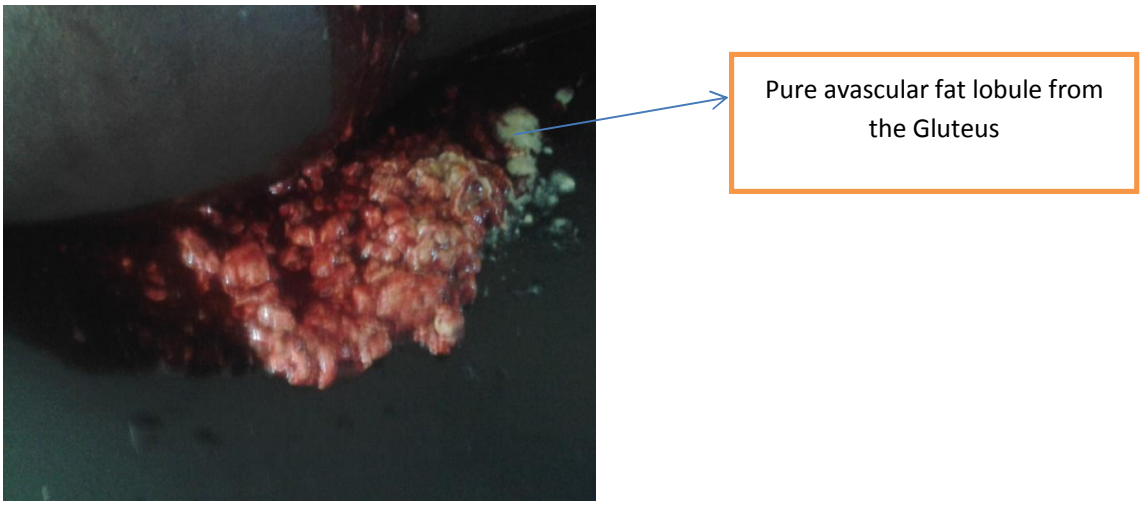

Fig. 8. Adiposenecrotic tissue removed from the abscess ulcer (Pyo- adipocytolytic -necrolysis subcutisor Pyo-adipo-necrolyzing subcutis)

Fig. 9. Necrotic Avascular and Pale adipose Lobules debrided on the first Day

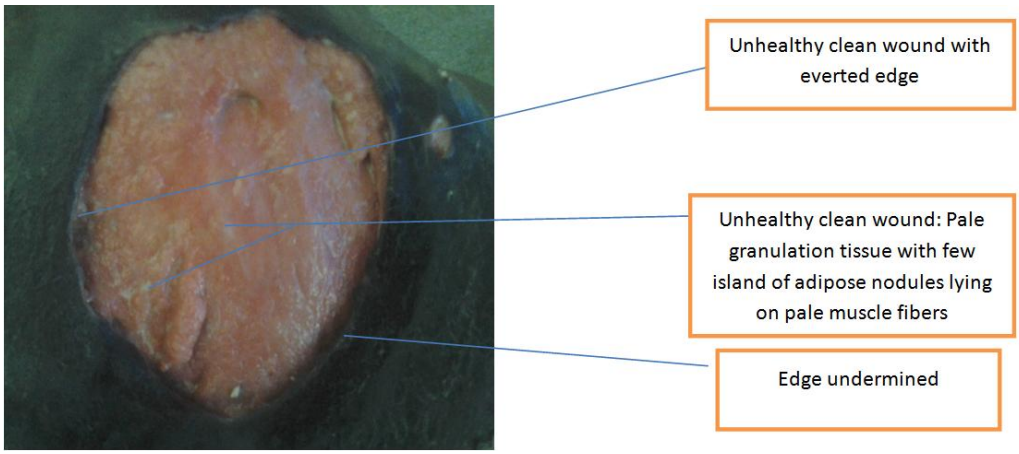

Fig. 10. Debrided wound after several courses of adipose and oily pus removals in right Gluteus

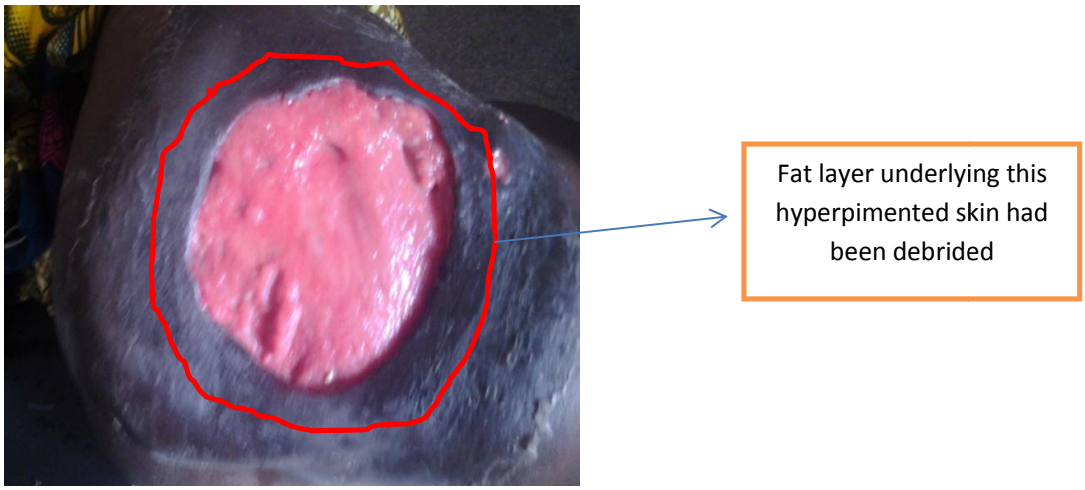

Fig. 11. Healing and contracting wound after 2 months of right Gluteus

Fig. 12. Right Gluteus Wound healed without skin graft after 10 months of out and in-patient care

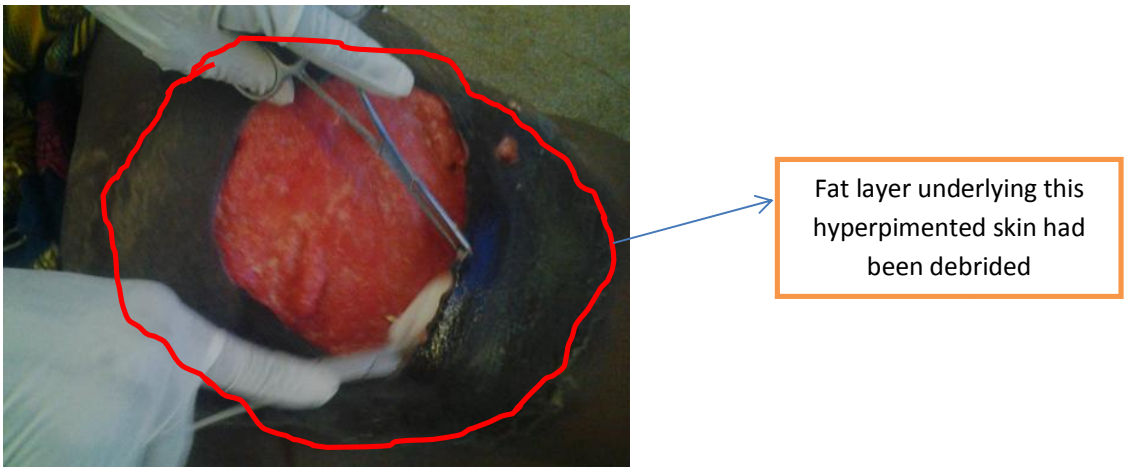

Fig. 13. Wound dressing: Island of granulation tissue and undermined skin flappy edge

No muscle mass in the child was noticeably necrosed but the child lost weight markedly. The patho-aetiogenesis was due to *Staphylococcal sp* and *Proteus sp* infections as seen in culture and sensitivity results of the pus collected. The implicating organisms have some level of microbial resistance and lower sensitivity as seen in (Case 1). A study (A) reported that in a 60 ml of thick green pus drained from a 26-year-old woman who had received a presumed intramuscular injection of triamcinolone in her left buttock for chronic eczema, showed coagulase-positive staphylococcus [6]. It therefore imply and affirms report [7] of inoculation of these organism during injections are the primary etiology. The virulent factor coagulase may not be the implicated organism in (Case 1) because of the distant and local extensive spread of necrosis but the enzyme was not determined in the culture. Antibiotic resistance and relative insensitivity as seen in case 1 may have promoted the spread of subcutaneous necrolysis, affirming other research articles [7,8] that reported Vancomycin and Methicillin resistant *Staphylococcus sp* (VRSA & MRSA) as causes of injection abscess. Multiple microbes cultured from the pus collectedwas a viable tool for the dermato-pathological entity as seen Case 1.

In Places where standard protocols for simple procedure as intramuscular, intradermal or subcutaneous injection are shelved aside, could lead to dire complications and pathological entities such as Pyo-adipo-necrolysis subcutis and Pan-necrotizing subcutis.

Pan-necrotizing subcutis can only occur when causative agent travel hematogenously with deposition of inflammatory marker into several non-injected subcutaneous sites of different regions of the body (Case 1), leading to several sites of subcutaneous necrosis in the skin of the body. Lymphatic system was not involved because no lymph node were found around the necrotic site. The extent of necrosis in the calves of both legs was so extensive into the fat pad of the popliteal fossa (Case 1).

A Surveillance Program found that 46 percent of hospitalized medical patients received at least one intramuscular injection during their stay [9]. Only 48 of 12,134 patients (0.4 percent) were reported to have had one of the following complications: abscess, induration, erythema, wheal formation, persistent local pain, hematoma, bleeding, and subcutaneous fat nodularity. Pediatric nurses, on the other hand, report a much higher incidence. Twenty-three percent of those surveyed had seen a complication from an injection they had been given [10]. Paralysis from infiltration of the sciatic nerve is an especially dreaded problem [11]; some children with such paralysis have been mistakenly diagnosed as having poliomyelitis [12]. Other serious complications include fatal gas gangrene, [13] distal ischemia due to intra-arterial injection of epinephrine, [14] and quadriceps myofibrosis [15]. These two phenomenon therefore are noticeable complications that may arise from unsafe injection.

The second case report (Case 2) had just one of the pathologic entities (Pyo-adipo-necrolysis subcutis) which was non-involvement of subcutaneous layer of several regions of the body as seen in Case 1. There was massive avascular necrosis of the adipose layer (Figs. 7, 8, 9) of the gluteus region with lysis of supporting tissue (elastin and collagen) in between fat segment leading to adipose lobules and nodules floating in the purulent collection (Fig. 2 & 7). There was lysis of adipocytes leading to milky and oily collections (Fig. 2, 5A, 5B, 7). Whatsoever organism implicated in case 2 would have coagulase, which made the event isolated as well as elastase and collagenase which broke down supporting tissue of the subcutaneous layer of the gluteus considering the necrotic features observed in Case 2.

The primary factor contributing to these complications was improper placement of the injection and possible failure to swab site with antiseptics before procedure. The classic placement in the upper outer quadrant of the gluteal may not have been consciously followed. The Swiss anatomist studied the problem and concluded that gluteal injections should be placed in a more lateral triangle bordered by the anterior superior iliac spine, the tubercle of the iliac crest, and the upper border of the greater trochanter [16]. A short needle can also be a problem in a massively obese gluteus as seen in the case2 therefore large fat sites should be avoided during deep intramuscular injections. In our patient (Case 2), the abscess may well have resulted from pathogens carried from the skin by the needle or seeded hematogenously into an area injured or made ischemic by the injectate especially in the large fatty layers which are naturally and relatively avascular. Furthermore the local inflammatory response was probably delayed by the effects of the pregnancy

hormones or age of the patient as noticeable in the reported cases.

Children, pregnant women, and malnourished persons are physiologically and relatively immunodeficient; these are factors that may potentiate the course of the subcutaneous pathologies as seen in our reported cases. Extra observation and care and must be taken when administering injections as well as swabbing presume sites prior to administering injections.

Poor or no hand washing, re-use of latex hand gloves and failure to swab the area before procedure are secondary causes of injection abscess. The secondary cause can be prevented by practicing internationally accepted standard for injections.

Prognosis and outcome of these dermatopathological entities were favorable as seen in both case report (Figs. 6 & 12) as long as there is adequate and high quality nutrition, immuno-competence, antibiotics that are sensitive and specific to the implicated micro-organisms, proper incision and drainage and high hemoglobin concentration. These factors play their various roles in the reported cases in ensuring healthy recovery despite long hospital stay and protracted expenses for services. The partial support received from International Non-Governmental organizations such as ICRC (International Committee of the Red Cross) and UNICEF (United Nations Children's Fund) as well as volunteer blood donors, made cost less burdensome for the families of the victims.

5. CONCLUSION

Unusual pathologies may emanate from unskilled or unsafe injections.

Pyo- adipocytolytic -necrolysis subcutis and Pan-necrotizing subcutis are unusual dermato-pathological entities that may occur in subcutaneous necrosis following unsafe intramuscular injection procedure, therefore injection practitioners much take precautionary measures following internationally protocols before and during the procedure.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Hanson D. Intramuscular injection injuries and complications. The American Journal of Nursing. 1963;63(4):99-101. DOI: 10.2307/3452558
2. Aaron Vunda. ABSCESS, Hopitaux Universitaires de Geneve. Available:raft.g2hp.net/wp-content/blogs.dir/9/files/2014/05/Abcess-at-the-injection-site.pdf (Access NOV of 2017)
3. Lois White, Gena Duncan, Wendy Baumle. Medical surgical Nursing-An integrated approach, Delmar centage learning, 3rd Edition. 2012;1066-1068.
4. Patterson JW. Panniculitis. Bolognia JL, Jorizzo JL, Schaffer JV, eds. Dermatology. 3rd ed. Philadelphia, Pa: Elselvier Saunders. 2012;1650-53.
5. James WD, Berger TB, Elston DM, eds. Diseases of subcutaneous fat. Andrews' diseases of the skin: Clinical Dermatology. 12th ed. Philadelphia, Pa: Elselvier Saunders. 2016;484.
6. Andrew McIvor, Michael Paluzzi, Michael M. Meguid: Intramuscular injection abscess — Past lessons relearned, Letter to the Editor, N Engl J Med. 1991;324:1897-1898. DOI: 10.1056/NEJM199106273242618
7. Sambandam SN, Rohini kumar GJ, Gul A, Mounasamy V. Intramuscular injection abscess due to VRSA: A new health care challenge. Archives of Bone and Joint Surgery. 2016;4(3):277-281.
8. Moran GJ, Krishna dasan A, Gorwitz RJ, Fosheim GE, McDougal LK, Carey RB, et al. Methicillin-resistant S. aureus infections among patients in the emergency department. N Engl J Med. 2006; 355(7):666–74. [PubMed]
9. Greenblatt DJ, Allen MD. Intramuscular injection-site complications. JAMA. 1978; 240:542–4. (Medline).

10. Beecroft PC, Redick S. Possible complications of intramuscular injections on the pediatric unit. Pediatr Nurs. 1989; 15:333–6:376. (Medline).
11. Gilles FH, Matson DD. Sciatic nerve injury following misplaced gluteal injection. J Pediatr. 1970;76:247–54. (Medline).
12. Hanson DJ. Intramuscular injection injuries and complications. GP. 1963;27(1): 109–15.
13. Van Hook R, Vandevelde AG. Gas gangrene after intramuscular injection of epinephrine: Report of fatal case. Ann Intern Med. 1975;83:669–70. (Medline).
14. Schanzer H, Gribetz I, Jacobson JH II. Accidental intra-arterial injection of penicillin G: A preventable catastrophe. JAMA. 1979;242:1289–90. (Medline).
15. Alvarez EV, Munters M, Lavine LS, Manes H, Waxman J. Quadriceps myofibrosis: A complication of intramuscular injections. J Bone Joint Surg [Am]. 1980;62:58—6. Medline
16. Kozier B, Erb G, eds. Techniques in clinical nursing. 2nd ed. Menlo Park, Calif.: Addison—Wesley. 1987;727–30.

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