



Diferencias de atracción de Calliphoridae a dos tipos de sutura diferentes.

DIFFERENCES IN THE ATTRACTION OF CALLIPHORIDAE TO TWO KINDS OF SUTURE.

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RESUMEN: Las heridas se caracterizan por ser atractivas para las moscas productoras de miasis (invasión de tejidos vivos por larvas de mosca). Las moscas de la familia Calliphoridae están ampliamente descritas como causas secundarias de miasis por lo que existe una especialización en medicina legal, más específicamente en la investigación de la "muerte bajo custodia", que estudia las miasis. Una herida recién suturada cabe preguntarse si las moscas Calliphoridae y sus larvas podrían haber sido atraídas a dicha herida ya que son capaces de modificar el aspecto de la lesión. La sutura es el método más común utilizado para el cierre primario de heridas en el Departamento de Emergencias (ED). En la mayoría de los casos las heridas se suturan con hilo de nylon y dos tipos de puntos quirúrgicos (puntos interrumpidos o intermitentes y continuos), por lo que estos puntos fueron seleccionados específicamente para este estudio.

PALABRAS CLAVE: SUTURA QUIRÚRGICA; CALLIPHORIDAE; MEDICINA LEGAL; MUERTE BAJO CUSTODIA

ABSTRACT: Wounds are known for being attractive to flies that obligatorily or optionally carry out their life cycle in living tissue. Flies of the family Calliphoridae are widely described as secondary causes of myiasis which is why there is a specialization in legal medicine, more specifically, in the criminal investigation of, that studies myiasis. If at the time of death a person has a recently sutured wound, it is worth asking if Calliphoridae flies and their larvae could have been attracted to said wound because they are capable of modifying the appearance of the lesion. Suturing is the most common method used for primary closure of wounds in the Emergency Department (ED). In most cases wounds are sutured with nylon thread and two types of surgical stitches (interrupted or intermittent stitches and continuous), so these points were specifically selected for this study.

KEY WORDS: SURGICAL STITCH; CALLIPHORIDAE; LEGAL MEDICINE; CRIMINAL INVESTIGATION

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1. INTRODUCTION.

It is known that wounds are attractive to flies because their larvae develop (in an obligatory or facultative mode) in living tissue [1, 2, 3]. The study of insects on corpses has shown that some species of blowflies (*Calliphoridae*) are attracted to wounds and to natural orifices. Furthermore, many can oviposit on them a very short time after death [4, 5]. The most frequent species in the early stages of decay are *Lucilia sericata* (Meigen, 1826) and *Calliphora vicina* (Robineau-Desvoidy, 1830) (Diptera: Calliphoridae) [4].

It is known that in legal medicine "death under custody" concerns the same legal considerations for autopsy practice and judicial investigation than any other doubtful death. Therefore, in our country there is a legal obligation to perform the forensic autopsy to any person who died in circumstances related with the arrest and the privation of freedom. Even when it is of seemingly natural cause or death doesn't take place inside the place of detention (prisons of police stations, even of courts 24 hours) [6].

Since this is a kind of autopsy especially problematic will be necessary to prove, not alone what was, but also what didn't

exist and it is here where the know-how on the wounds becomes critical.

If in their moment of death, a person has a wound recently sutured, it is necessary to wonder if this wound is as attractive to the flies as a bleeding wound. In addition, it is also necessary to consider the fact that the colonization of larvae of flies modifies the aspect of the lesion.

Suture is the most common method used for primary wound closure and it can be performed using a different technique, type and/or size of suture material. The appropriate suture material and placement technique used should be based on the location, size, nature, and level of contamination of the wound, as well as the personal preference of the treating health care provider. Nonabsorbable suture materials, such as nylon and polypropylene, retain most of their tensile strength for over 60 days and must be removed. This type of suture is relatively nonreactive and it is used to close the outer layer of the wound[7].

In 1996 Singer[8] it is said that the laceration repair in the Emergency Department (ED) is typically performed using primary closure, which involves immediate approximation of the edges of the wound to improve the rate of healing as well as aesthetic appearance. There are characteristics of the wound that should be accounted for to clinically determine whether or not primary closure can be safely implemented. These factors include location, the degree of contamination, and time from injury to laceration closure, as well as the patient's predisposing medical conditions.

Types of sutures:

- 1.1. Interrupted or intermittent: The interrupted suture is a technique that uses many strands of the suture material in order to close a wound. Once the stitch is made, the health care provider cuts off and ties the material. The interrupted suture technique enables the doctor to close the wound in a way that even if one stitch breaks, the remaining ones can still hold the wound together.
- 1.2. Continuous: The continuous suture is a surgical technique which involves several stitches where the health care provider uses a single strand of the suture thread material. This technique is applied quickly while placing a suture and it also allows the tension to be evenly distributed throughout the suture strand.

Clinical presentations should have a detailed analysis referring to the time of the injury and the mechanism that

made them (a cut with a knife or a crush suffered when a finger is caught in a door). As with all injuries, it is important to clearly understand the mechanism so as to provide the appropriate care according to the magnitude of the injury. If the injury occurred in the setting of an occupational exposure, there may be particular chemicals, acids, or bases that need to be considered. These types of injuries can result in devitalized tissue that may need debridement as well as ongoing assessment as this wound may continue to evolve over time. Furthermore, certain mechanisms may require more extensive evaluation (bites, injections and so forth) and possible subspecialty consultation. Finally, wounds occurring in contaminated environments may also dictate further treatment and follow-up[7].

The purpose of this work is to obtain data on the attraction of adult *Calliphoridae* towards interrupted or intermittent and continuous suture and its potential application to cases of death under custody.

2. MATERIALS AND METHODS.

First, the work table has been cleaned with Yodopovidona, moving away the surplus with physiologic solution. Next, a sterile big surgical field was placed on the surface of the stipend, on which all the sharp elements and properly sterilized suture were prepared.

After being washed with soapy solution of Povidone-Iodine, the three phalanges III and IV of the acropodium of the pig, well-known in the trade like "pig paw", were placed on the surgical field.

A clean, sharp wound was made on two pig feet, using an included scalpel blade. Both injuries were sutured with MONOSOF® Nylon Suture 4-0 with Needle C-1, using two different types of sutures[9].

- I). Case 1 Interrupted or intermittent stitch (Photo 1a)
- II). Case 2 Continuous stitch (Photo 1b)
- III). Case 3 Control. The control was the third paw in which a sharp wound was inflicted but was not sutured.



Photo: Case 1 Interrupted or intermittent stitch (Photo 1 a) ; Case 2 Continuous stitch (Photo 1b)

Each of these cases, with the proper labeling, was carried out in disposable aluminum trays, which received direct sun for three hours per day, between approximately 12:00pm and 15:00pm. Subsequently, they were transferred to the laboratory where the state of the sutures was observed. This process of exposition to the sun and analysis in the laboratory was repeated for ten days.

At this time, the larvae were in their post-feeding state and ready to start their support to begin the pupation process. Therefore, at this point, the experiment was terminated.

3. RESULTS.

Regarding the condition of the sutures:

Case 1: Calliphoridae oviposited on the first day. The eggs were observed in the area of the wound that remained free between one point and the next. This type of suture did not resist the proteolytic enzymes transpired by the mass of active larvae in the wound. As a consequence of the larval activity, some points were detached from one of the lips of the wound. (Photo 2)

Case 2: Even though adults were observed on the wound since day [completar con lo que corresponda], only on day four larvae were observed inside the wound, which began to open allowing the access of the entomofauna to the deeper layers of the tissue. Nevertheless, intact Nylon thread was observed within the mass of larvae (Photo 3)

Case 3: Here there was a rapid colonization of the fly larvae. There was an oviposit on the first day and by the eighth, only the bones of the phalanges III and IV were exposed. .

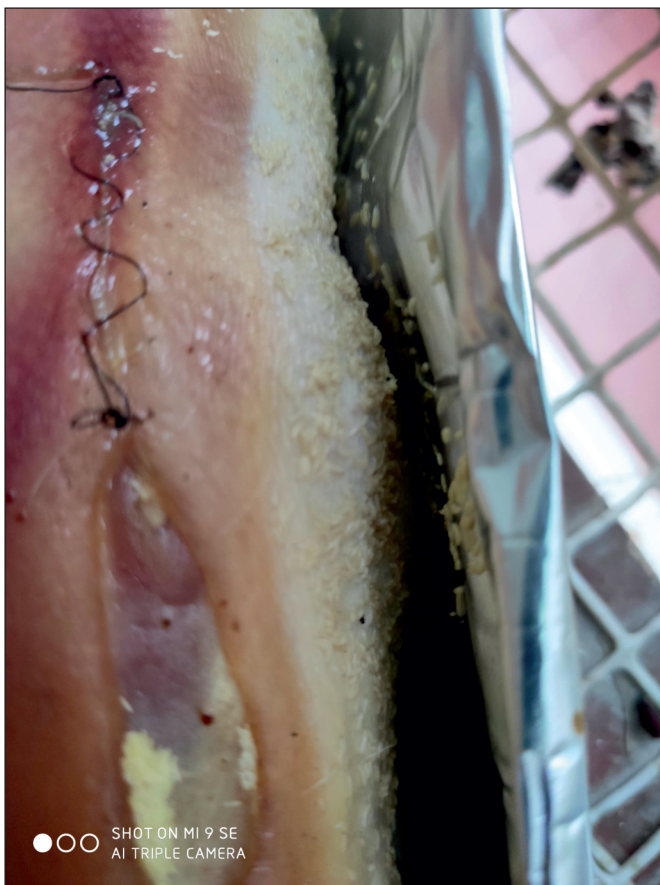


Photo 2.



Photo 3.

The entomofauna seen on the first day corresponds to the species of *Lucilia sericata* (Meigen, 1826) and *Calliphora vicina* (Robienau-Desvoidy, 1830), both of the family *Diptera*, *Calliphoridae*. These species are the primary call in the process of outdoors colonization of bodies and facultative on myiasis in Capital Federal[4].

It is important to say that the term myiasis was introduced in reference to dipteran larvae infesting a human body. To be more precise, myiasis is defined as the infestation of a living human or vertebrate animal with dipterous larvae during a period of time in which the dipterous larvae feed on the host's dead or living tissue, liquid body-substances and/or ingested food. Species causing myiasis may be obligatory or facultative, usually developing on decaying organic

matter but occasionally depositing eggs or larvae on living hosts[10].

The greenfly *L. sericata* and blowfly *C. vicina* (*Diptera: Calliphoridae*) are very common urban species of fly and they are also a facultative ectoparasite. Adult *Calliphoridae* females lay eggs on fresh cadavers immediately after death under favorable conditions. The ability of these flies to locate and colonize corpses represents a key characteristic used in forensic investigations to estimate the postmortem Interval. Both species act as the secondary agent of myiasis[11,12] It is because of this ability to occupy two different ecological niches (living tissue and dead tissue) that they are of interest as facultative colonizers of recently sutured wounds.

4. DISCUSSION.

The experiment satisfactorily proves that larval activity can erase the rakes of some threads, the entrance holes and of exit of the needle they are marked in the skin. Therefore, if a death under custody happens and the deceased has this type of sutures, it should be kept in mind that the primary species of *Diptera* that will colonize the body will also be attracted to oviposit on this wound type. This preference of the *Diptera* can be the cause of reopening of previous lesions that are not related with the cause of the death.

Taking into consideration all that has been stated in this study, it would be advisable, when it is possible, that the EDs staff perform continuous sutures on patients who allegedly committed a crime and remain in police custody. With this precaution, it can reduce the risk of myiasis on recently sutured wounds.

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