BARÇA
INNOVATION HUB
Universitas

PATHOLOGIES IN TEAM SPORTS

ACCIDENTS AND EMERGENCIES

1.1 Accidents and Emergencies

Bernat de Pablo

1. Cardiorespiratory pathology. Unconscious patient

1.1. Cardiorespiratory arrest. Sudden death

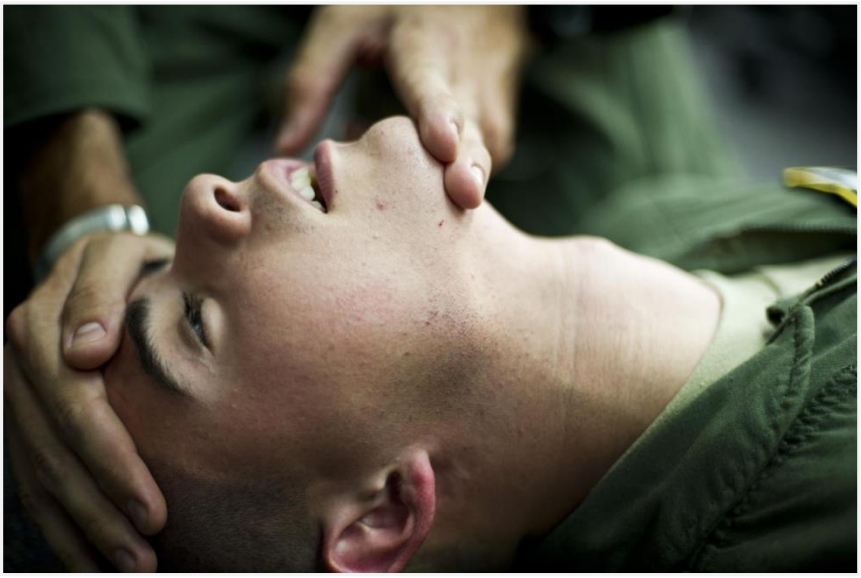
The annual rate of sudden cardiac death (SCD) in athletes is estimated to be 2 cases per 100,000 athletes per year. *A pre-participation screening significantly reduces the risk of such events. The American Heart Association recommends maintaining a full medical record and undertaking a physical examination whilst the European Society of Cardiology also recommends running an electrocardiogram at rest.* Ergometry is advisable for people over 30 years of age, although its cost effectiveness in terms of preventing SCD is debatable.

The most common causes of SCD in young athletes are hypertrophic cardiomyopathies, congenital coronary anomalies, arrhythmogenic dysplasia of the right ventricle, aortic stenosis and Brugada syndrome.

Given that the *team sports physician* typically attends to support staff, referees, managers, etc., as well as athletes, we must be aware that the most frequent cause of cardiorespiratory arrest (CRA) is ischemic heart disease.

A quick and systematic assessment should always be carried out on an unconscious athlete to rule out CRA. The airway must be correctly opened to evaluate if the patient is breathing correctly (Figure 1).

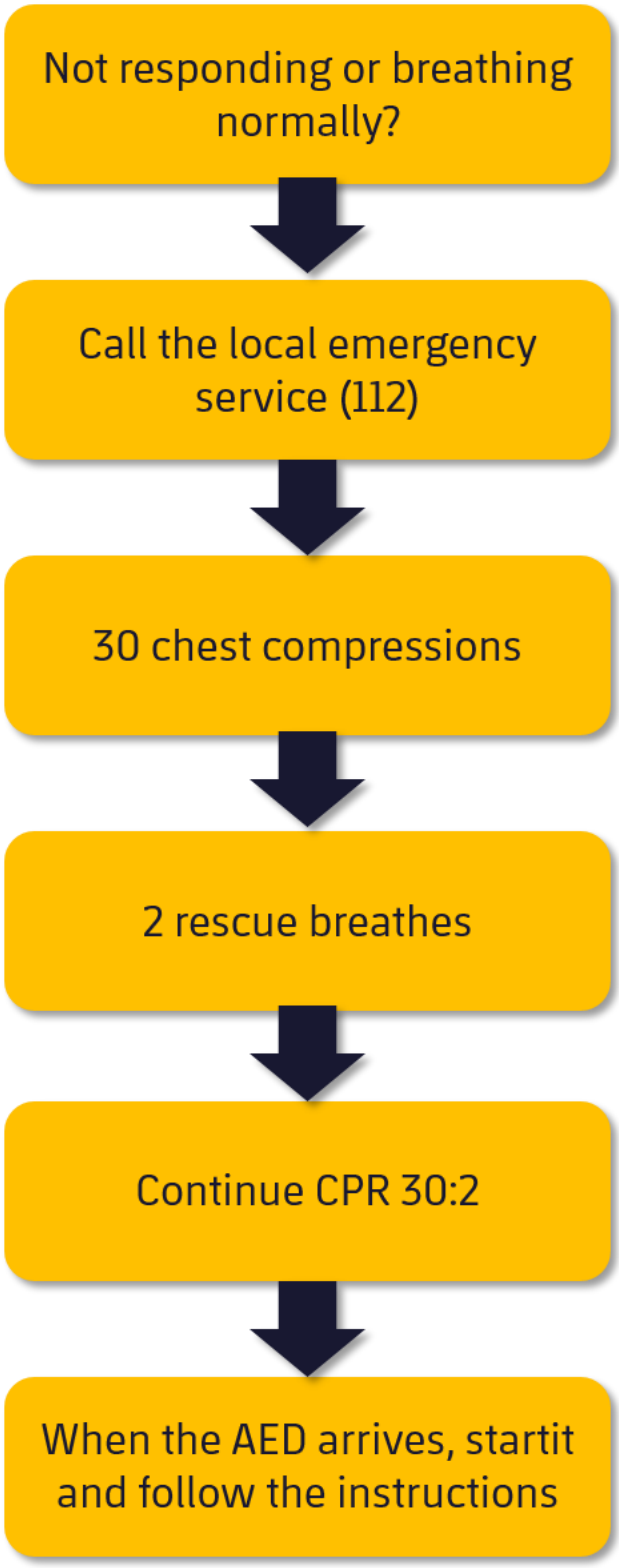
Figure 1: Opening the airway



Source: Untitled image for Opening the airway, (2017), retrieved from: https://almostadoctor.co.uk/encyclopedia/airway-management/attachment/120807-f-jh117-089

An unconscious patient who is not breathing normally will be diagnosed with CRA, and the procedure outlined below must be followed.

Figure 2. CRA Procedure



Source: Monsieurs et al., 2015, p. 13.

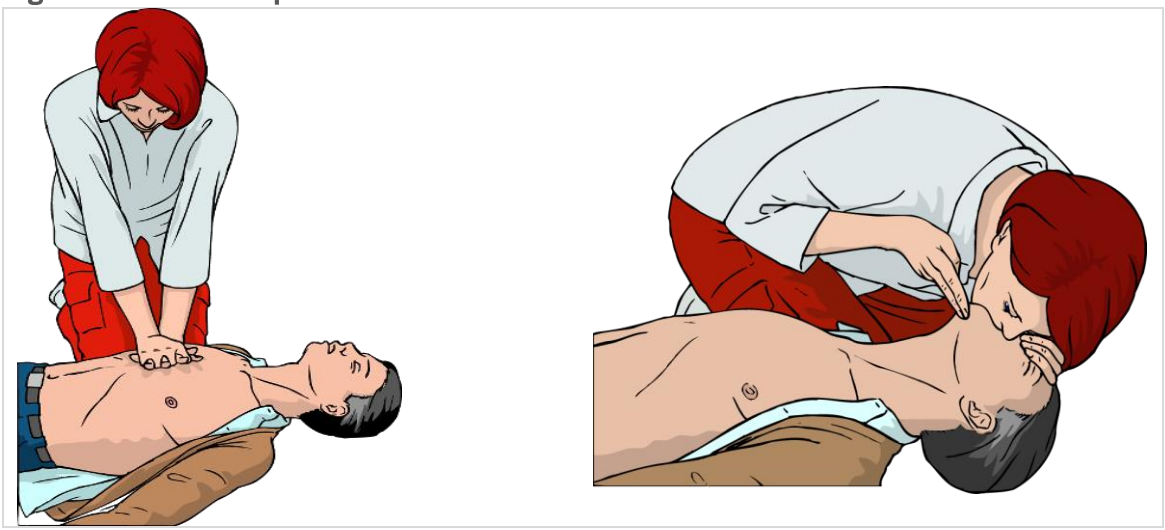
Important points to keep in mind when dealing with CRA:

- The use of an automated external defibrillator (AED) is a single procedure that saves lives.
- Well-executed cardiopulmonary resuscitation (CPR) maneuvers reduce mortality and long-term sequelae.
- Early detection of CRA, starting CPR and the use of an AED are all key to improving the chances of survival.

Quality CPR:

- 30 compressions/2 breaths (Figure 3).
- Speed: 100-120 compressions per minute
- Depth of compressions: 5-6 cm
- Change person administering CPR every two minutes or when fatigued.
- Reduce interruptions during CPR to a minimum

Figure 3: Chest compressions and rescue breaths



Source: https://bit.ly/2rsgky0

1.2 Unconscious patient

For an unresponsive patient who breathes normally (except when caused by trauma).

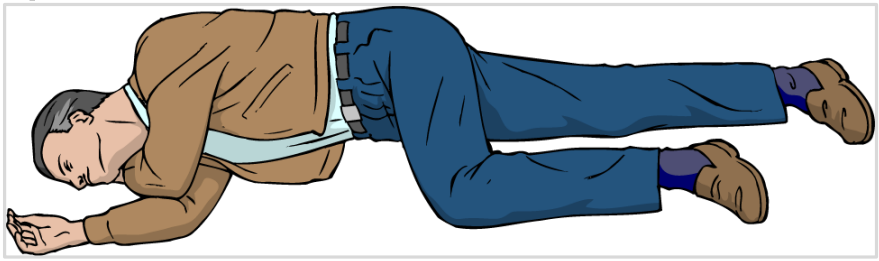
We must identify the cause:

- Hypoglycemia.
- Neurological focus: CVA (cerebrovascular accident), epilepsy.
- Alcoholic coma.
- Dehydration.
- Heat stroke.

We must:

- Call the local Emergency Services
- Put the patient in the recovery position (Figure 4).
- Permeabilize the airway (Guedel/Mayo-tube), if tolerated.
- Apply cold compresses to the armpits and neck in the case of heat stroke.
- Do not administer liquids or medication to an unconscious patient.
- Continually reassess.

Figure 4. Recovery position.



Source: Monsieurs et al., 2015, p. 17.

2. Trauma-based pathology

The initial response to an athlete affected by trauma is as follows: the first action must be to assess whether the athlete has suffered a localized trauma or a multiple trauma. Localized trauma is the most frequent kind; multiple trauma is more common in specific disciplines (such as cycling, motorcycling, motor racing, skiing, among others).

2.1 Multiple trauma

In the case of multiple trauma, the surrounding environment should be assessed and the ABCDE approach must be followed:

A: *airway*. Monitor the airway and stabilize the cervical spine. The airway must be permeabilized (open and obstacle-free). All multiple trauma patients must be assumed to have a spinal injury until proven otherwise. Therefore the cervical spine must be immobilized (using a rigid cervical collar), along with the dorsal and lumbar spine (using a spinal board). A rigid cervical collar only provides 40-70% immobilization so the patient must also be manually stabilized.

B: *breathing*. Ventilation. Oxygen must reach the lungs. Check that the patient is breathing and if not, start ventilation using a bag-valve mask, mouth-to-mouth breathing or other devices. The airway should be permeabilized with an oropharyngeal cannula (Guedel/Mayo tube). The thorax must also be evaluated to assess asymmetries and signs of pneumothorax or cardiac tamponade.

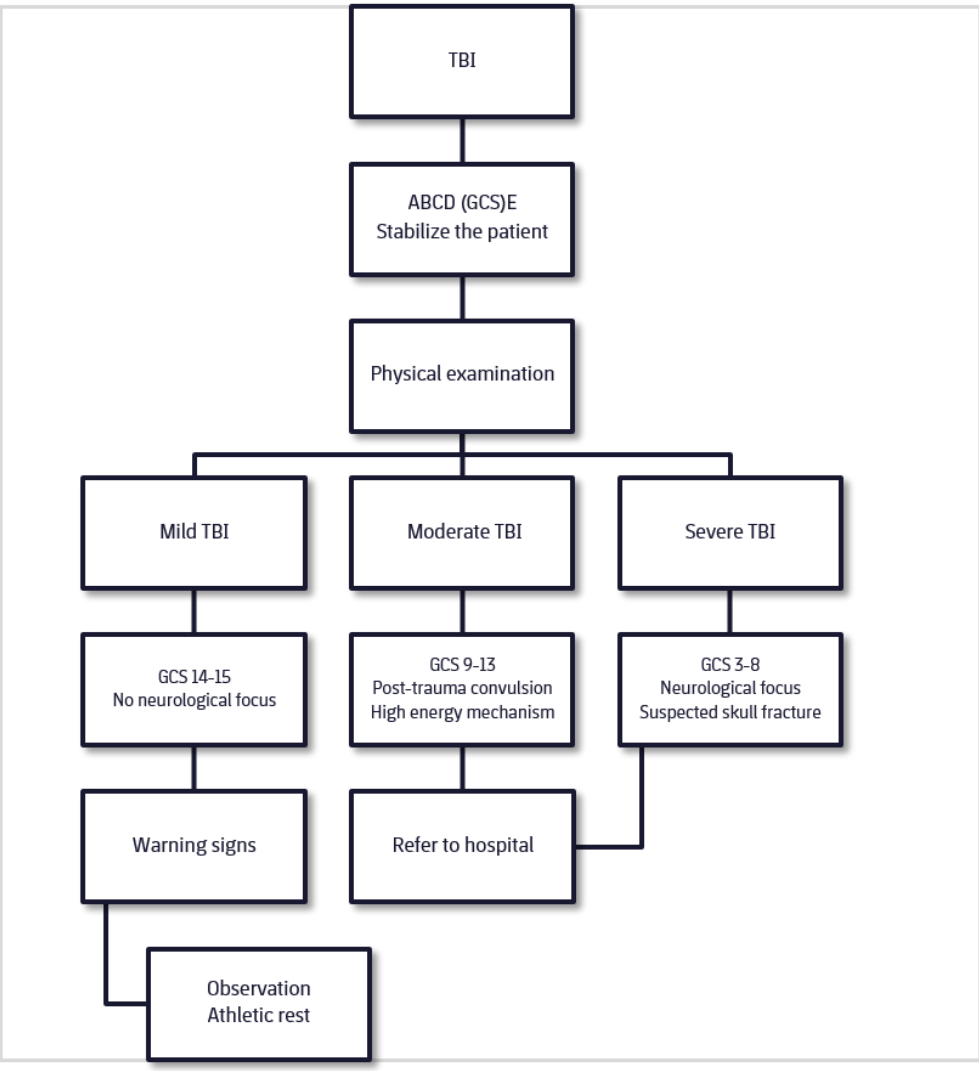
C: *circulation*. Circulation and controlling bleeding. For external bleeding: direct pressure on active bleeding, elevate extremities. A tourniquet is always a last resource. If internal bleeding is suspected, prioritize access to veins for infusion of fluids and for the urgent hospital transfer. Pelvis and abdominal trauma have a high risk of internal bleeding. Next, check the vital signs: heart rate, blood pressure and capillary refill time.

D: *disability*. Neurological deficit. Glasgow Coma Scale, check pupils.

E: *exposure*. Expose skin and check for hypothermia. Check inconspicuous areas (back, armpits and perineum), always with block mobilization, controlling the cervical spine. Avoid hypothermia.

2.1.1 Traumatic brain injury

Figure 5. Classification of traumatic brain injury



Source: Prepared by the author.

Important:

In the case of an unconscious athlete due to a TBI or vertebral trauma, do not:

- Mobilize the cervical spine.
- Move them into a recovery position without stabilizing the cervical spine.
- Try to permeabilize the airway manually (do not insert fingers into the mouth).

- When there is multiple trauma as a result of a high-energy accident (car, motorbike, etc.), do not take the injured person's helmet off unless you have the knowledge and tools necessary to extract them from the vehicle.

Figure 6. How to respond to an athlete who is unconscious due to a trauma

Source: https://bit.ly/2wnLCuQ

2.2. Localized trauma

Start by undertaking an anamnesis of the injury mechanism, the type of pain and its intensity (VAS). This should be a thorough physical examination.

Two decisions should be made on the field of play:

- Can the athlete continue to play?
- Is further medical attention required?

2.2.1. Dislocation:

- Glenohumeral dislocation: treatment guidelines do not recommend using reduction maneuvers before ruling out associated fractures.
- Finger dislocation: reduction plus functional bandage or splint.
- Ankle dislocation: reduction maneuvers are only recommended in cases where vascular or nervous injury is suspected.
- Patellar dislocation: typical in patients with joint hypermobility and with reduced quadriceps musculature. A reduction maneuver with progressive extension of the knee and lateral pressure on the

patella is recommended. Then the limb must be immobilized, the athlete should not continue playing.

For correct reductions in dislocations, our objectives must be:

- Address contracture and pain to facilitate maneuvers, either through local, intra-articular, truncal anesthesia or sedoanalgesia.
- Post-reduction immobilize correctly.
- After a dislocation, the joint's supporting tissues are incompetent, so the risk of recurrence is high. Continuing play after a dislocation is not encouraged.

2.2.2. Fracture

Signs of fracture:

- Intense localized pain with functional incapacity.
- Deformity.
- Hematoma.
- Abnormal position of the extremity.
- Deviation in the bone axis.
- Crepitus.

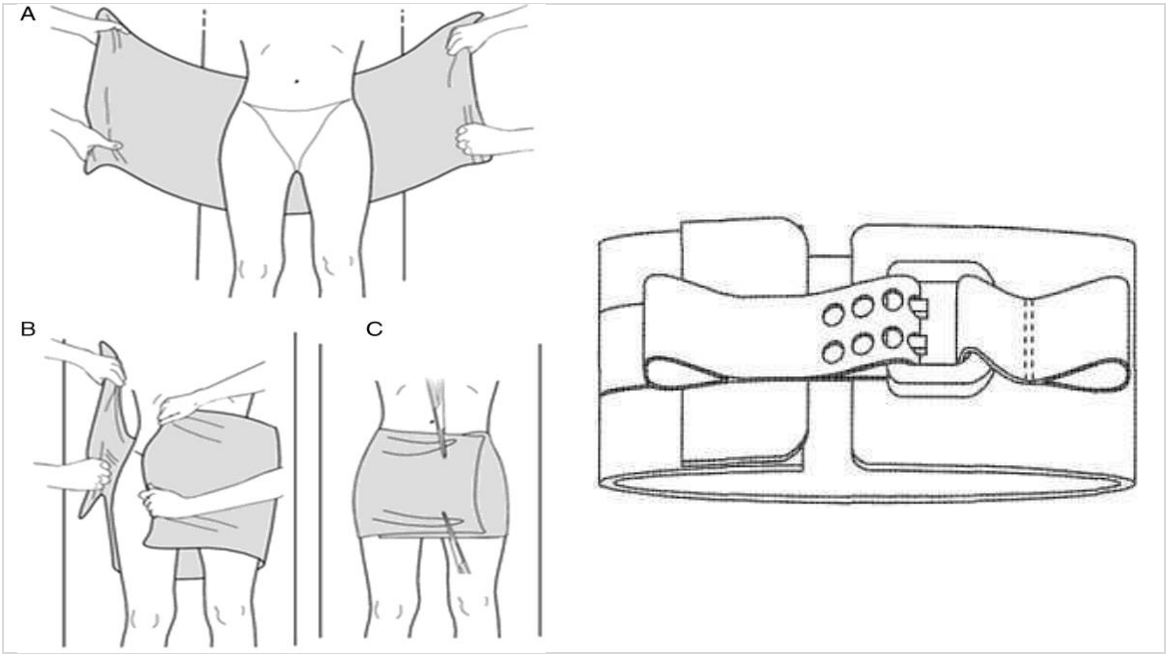
Referral criteria:

- Suspected pelvic ring fracture.
- Open fracture.
- Displaced fracture.
- Nerve or vascular damage.
- Fracture and dislocation.
- Suspected compartment syndrome.

Action:

- Align the fracture, unless there is an exposed fracture, in which case mobilizations must be avoided.
- Assess the presence or absence of distal pulses and compromised sensitivity, in order to rule out a nerve or vascular injury. If a nerve or vascular injury is suspected, perform traction on the limb to reverse the situation. These maneuvers must be carried out by trained professionals.
- - In case of suspected fracture of the pelvic ring, stabilize it, either with a specific device or using a sheet, as shown in the following figure.

Figure 7. Pelvis stabilization devices



Source: https://bit.ly/2I2oBiv

2.2.3. Wounds

Warning signs:

- Loss of substance.
- Arterial bleeding (pulsatile).
- Uncontrolled bleeding.
- Dirty wound.
- Embedded foreign objects.

Action:

- Assess if the athlete can continue to play with the wound. Evaluate the use of bandages, sutures and closure with staples or skin glue. This must always be done using maximum hygiene to avoid further infections.
- In case of hemorrhage, apply direct and constant pressure. Elevate the extremity whenever possible.
- In case of arterial bleeding, apply prolonged pressure.
- In the case of uncontrollable bleeding and only in the event that this puts the patient's life at risk (due to hypovolemic shock), assess the need for a tourniquet. It is very important to record the time that the tourniquet is applied (ischemia time). Urgent hospital transfer.

2.2.4. Epistaxis

Direct compression of the nostrils, apply ice and keep the person in a sitting position with their head leaning forward. Evaluate possible nose fracture. Anterior nasal pack with epinephrine.

2.2.5. Loss of teeth

Conserve in physiological serum. Urgent need for maxillofacial surgery to assess reimplantation.

3. Generalities

3.1. Accident and Emergency Care Circuits

For all sporting events, possible emergency situations must be anticipated.

Plans must be in accordance with the emergency plans of the organizing entities and current regulations.

Depending on the type of event, the following must be considered:

- Preventive equipment: basic or advanced life support ambulance, first aid stations.
- Security guards: police, civil protection.

The medical or health team must be part of the emergency plan and must be aware of the available resources. Likewise, members of the emergency plan should know where the health personnel are located and have the means to communicate with them.

Supplies for accident and emergency care must be reviewed periodically.

3.2. Medical supplies

Medical supplies must be adapted to the sport and level of competition. Different supplies will be required for low contact activities versus those with risk of high-energy trauma (cycling, motor sports, etc.).

Table 1: Team sports physician's first aid kit.

Team Sports Physician. First aid kit		
CRA Care	Trauma care	Medication
Stethoscope Tensiometer Pulse oximeter AED Oropharyngeal cannulas Oxygen therapy equipment Resuscitator ball Laryngoscope Endotracheal tubes	Rigid cervical collar Spinal board Vacuum mattress Splints/slings Functional bandage Elastic bandage Dressings (sutures, staples) Pelvis stabilizer	Venoclysis equipment Intravenous medication - Serotherapy - Analgesics (dexketoprofen, metamizole, fentanyl) - Advanced CPR medication (adrenaline, amiodarone, adenosine)

Source: Prepared by the author

References

American College of Sports Medicine. (1999). *Manual ACSM de medicina deportiva*. Barcelona, SP: Paidotribo.

American College of Surgeons. (2012). *ATLS: Advanced trauma life support course manual* (9th). Chicago, US.

Grazioli, G., Sanz de la Garza, M., Vidal, B., Montserrat, S., Sarquella-Brugada, G., & Pi, R. (2017). Prevention of Sudden Death in Adolescent Athletes: Incremental Diagnostic Value and Cost-Effectiveness of Diagnostic Tests. *European Journal of Preventive Cardiology, 24*(13), 1446-1454.

Harnan, S. E., Pickering, A., Pandor, A., & Goodacre, S. W. (2011). Clinical Decision Rules for Adults with Minor Head Injury. A Systematic Review. *Trauma, 71*(1), 245-251.

Monsieurs, K., Nolanc, J., Bossaert, L., Greiff, R., Maconochie, I., Nikolaoui, N., & Zideman, D. (2015). Recomendaciones para la resucitación del Consejo Europeo de Resucitación (ERC). Madrid, SP: Consejo Español de Resucitación Cardiopulmonar. Retrieved from https://cprguidelines.eu/sites/573c777f5e61585a053d7ba5/content_entry573c77e35e61585a053d7baf/57f51ee14c84866a3ec3867c/files/Recomendaciones_ERC_2015__Resumen_Ejecutivo_19012016_SPA.pdf?

Pablo de, B, Tresserras, G., & Romero, M. (2017). Manejo del traumatismo vertebral en el medio extrahospitalario. *FMC, 24*(4), 189-192.

Roa Silva, J. (Ed.). (2006). *Urgencias y emergencias en medicina deportiva*. Santiago de Cali, CO: Salamandra.