November 2022

STANDARD OPERATING PROCEDURE

FOR

MANAGEMENT OF SNAKEBITE

MINISTRY OF HEALTH
NATIONAL UNITY GOVERNMENT OF MYANMAR

CONTENTS

1. Rapid Assessment and Resuscitation

- Check airway, breathing and circulation
- Note BP, HR, and signs of shock
- Note rate and depth of respiration and SpO2
- Check 20WBCT (2 cc of blood in clean dry sterile glass bottle and keep for 20 minutes and then check)
  NB: 20WBCT = 20 minutes whole blood clotting test; detailed procedure in annex section

2. Further assessment

- Species identification (whether the snake or a photo is brought to the facility)
- Enquire time of bite, circumstances at the time of bite, any initial manipulation
- First aid treatment
- If Anti-Snake Venom (ASV) has been given, time of initial ASV, type and dosage of ASV, and reaction to ASV should be noted
- Look for signs of envenomation and decide on giving ASV
- Ensure tetanus vaccination is up to date

3. Envenomation

3.1. Russell's viper bite

3.1.1. Local Envenoming

- Local swelling involving more than half of the bitten limb (in the absence of a tourniquet) within 48 hours of the bite
- Rapid extension of swelling (for example, beyond the wrist or ankle within a few hours of bite on the hands or feet)
- Enlarged tender regional lymph nodes draining the bitten limb

3.1.2. Systemic Envenoming

- Spontaneous systemic bleeding
- Non-clotted blood
- Hypotension or shock
- Epigastric pain/renal angle pain
- AKI: acute kidney injury (e.g., Oliguria/anuria)
- Heavy proteinuria (proteinuria +++ or above)

3.1.3. Features of severe systemic envenoming

1. Life threatening bleeding
2. Shock
3. Collapse

3.2. Cobra and Krait bite

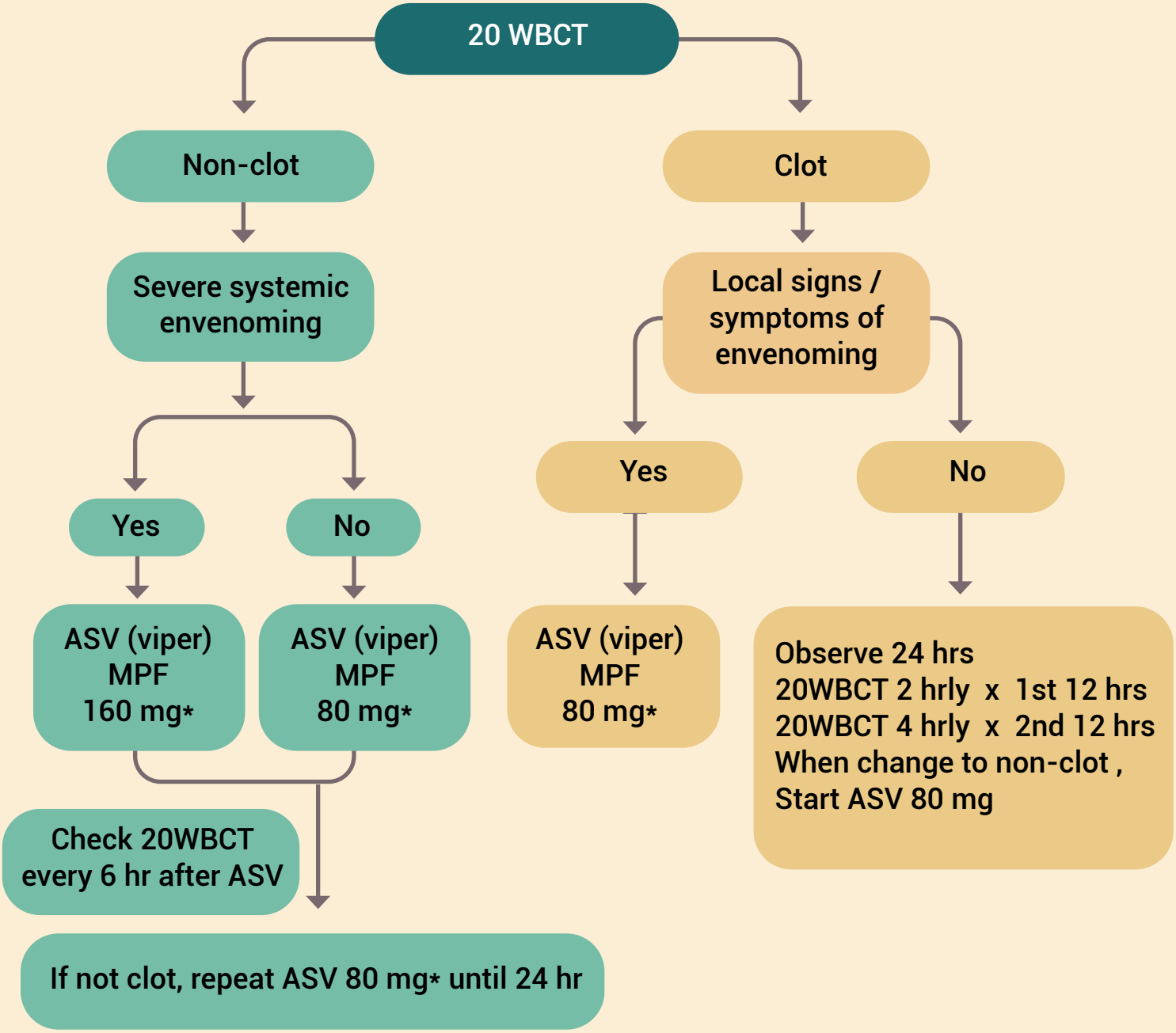
Neurotoxic envenoming signs

- Ptosis
- Slurring of speech
- Inability to open the mouth and protrude the tongue
- Increase salivation
- Broken neck sign
  (weakness of neck muscles leading to unable to flex the neck)
- Shallow and rapid respiration
- Flaccid paralysis

4. Indications for ASV

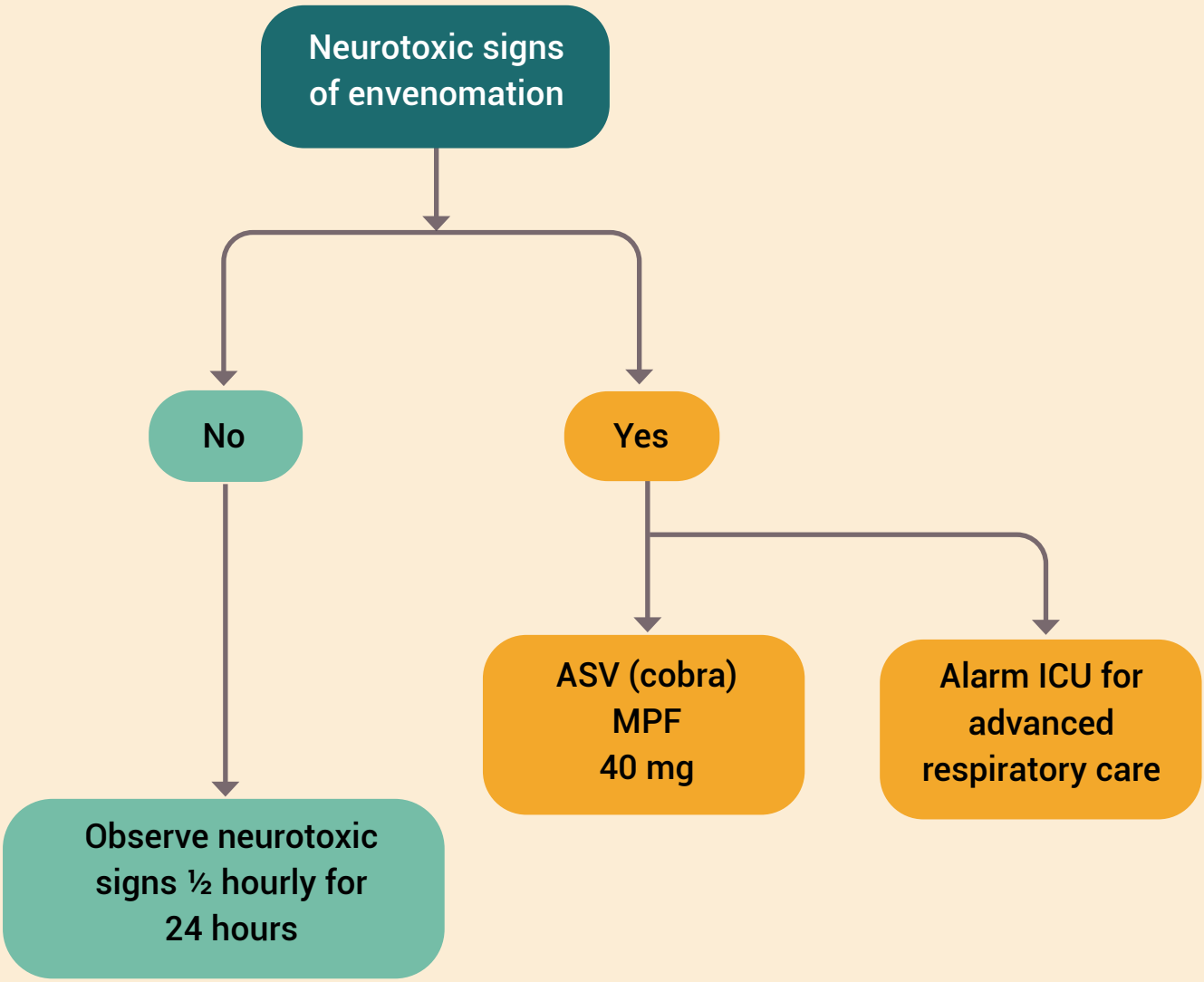
- Not all snake bite cases need ASV administration.
- ASV should be considered depending on the severity of signs of envenomation and positivity of 20WBCT

1. Algorithm for ASV dosage in confirmed Russell's viper bite

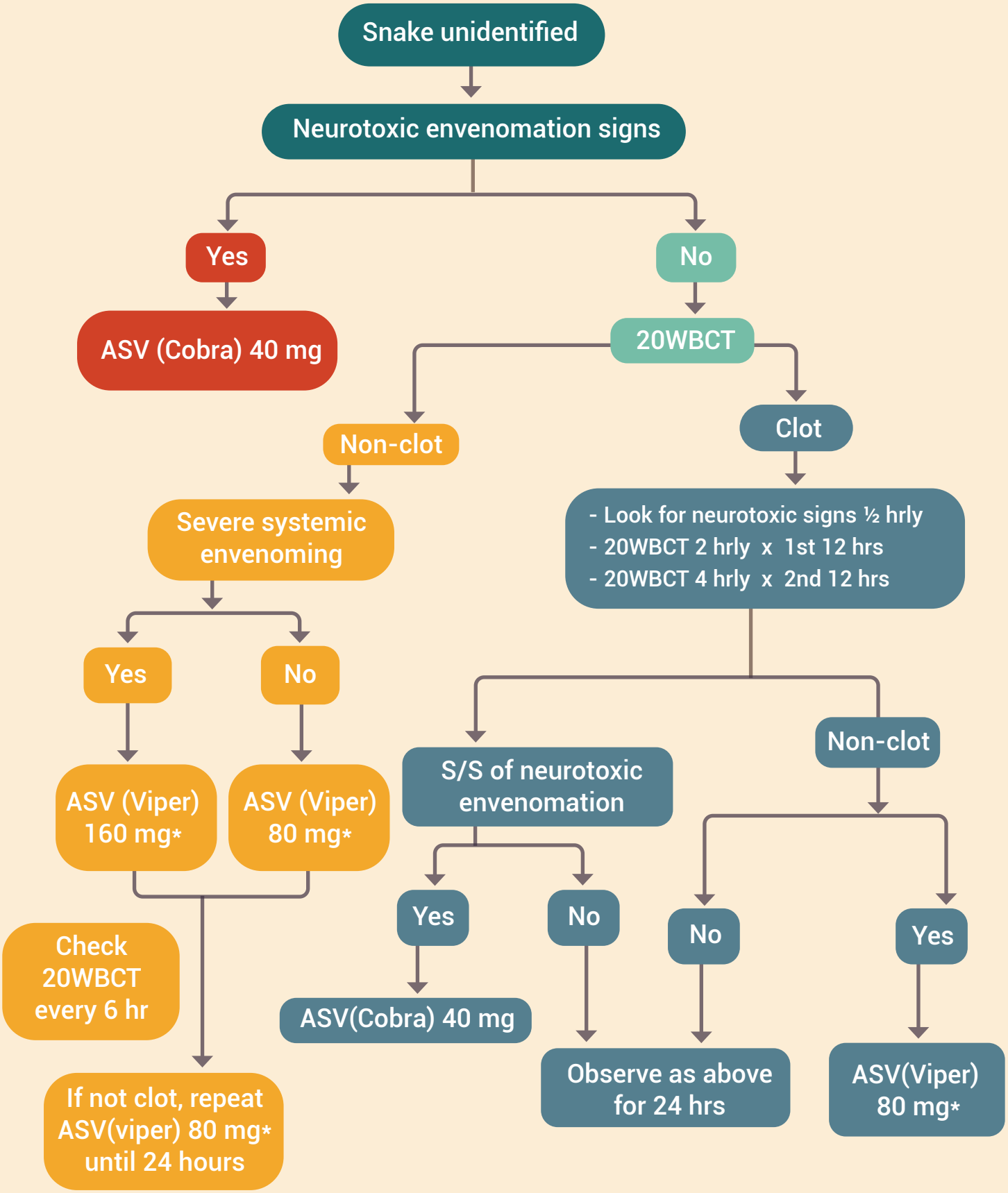


*If MPF monovalent viper ASV is not available, 14 vials of lyophilized India polyvalent ASV may be considered.
(**80 mg of MPF monovalent** viper ASV ~ 14 vials of India polyvalent ASV).

2. Algorithm for ASV dosage in confirmed cobra bite



3. Algorithm for management of unidentified snakebite



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Note

- Children can be given adult dose.
- No dose reduction for bites by small snakes.
- ASV should be given as soon as possible if it is indicated. ASV may reverse systemic envenoming even when this has persisted for several days or in the case of hemostatic abnormalities up to 7 days.
- Give ASV infusion over about 20 minutrs.
- Green snakebite is possible with non -clot 20 WBCT and severe local swelling. In that case urine albumin is usually negative and ASV is not indicated.
- In any snake bite patient, if 20 min WBCT is normal, observe carefully for possibilities of neurotoxic envenoming due to cobra and krait bite, especially the type of snake is unable to be identified.
- Check the rate and depth of respiration every 30 minutes or more frequently if necessary
- Aware of hypersensitivity reaction to Anti-venom and facilities for anti-shock measure must be ready.

Indications for repeating more anti-venom (Both Russell's viper and Cobra)

- If blood remains incoagulable after 6 hours
- If patient continues to bleed (repeat ASV in 1-2 hours)
- Deteriorating cardiovascular signs like hypotension, shock, arrhythmias (repeat ASV in 1-2 hours)
- Persistence of neurotoxic symptoms and signs in 1-2 hours after ASV.

40 mg of MPF ASV for cobra and 80 mg of MPF ASV for viper can be repeated if above indications are present.

(Total maximum dose is quite variable, usually maximum dose for Russell Viper is 240 mg MPF ASV)

Treatment of nephrotoxic envenoming

- Monitor for blood pressure, pulse rate, fluid status, urine output and bleeding manifestations.
- Monitor urine albumin, urea, electrolytes and creatinine.
- If available, consider referral to dialysis center for persistent acute kidney injury despite receiving ASV.

Treatment of neurotoxic envenoming

- Anti-venom treatment alone cannot be relied upon to save the life of a patient with bulbar and respiratory paralysis.
- Anticholinesterase drugs (e.g., Tensilon/edrophonium) are potentially very useful effect in patients with neurotoxic envenoming, especially in cobra bite
- Baseline observation (respiration, ptosis, muscle power)
- Give IV atropine 0.6 mg for adult and 50 ug/kg for children
- Give Anticholinesterase (Tensilon/edrophonium chloride) 10 mg for adult and 0.25 mg/kg for children
- Observe effect for improvement of neurotoxic symptoms and signs for 10-20 minutes after injection
- If positive, institute regular atropine and long-acting anticholinesterase like neostigmine 1.5 mg IM and repeat with 0.5 mg every 30 minutes until recovery
- If edrophonium is not available, other cholinesterase e.g., Neostigmine, pyridostigmine can be used without initial trial
- Keep ambu bag ready for emergency resuscitation in case of respiratory arrest
- Consider assisted ventilation by referring to ICU in tertiary center

5. Management of anaphylaxis

- Recognizing and diagnosis of anaphylaxis is essential during anaphylaxis.
- Check Airway/Breathing/Circulation.
- Give IM adrenaline. Repeat IM adrenaline after 5 minutes if features of anaphylaxis do not resolve. After injection, close monitoring of vital signs, BP and cardiac rhythm must be done.

Adrenaline IM dose (according to age); Use **1 mg/mL [1:1000]** adrenaline

Adult and child > 12 years	500 micrograms IM (0.5 mL of 1 mg/ml adrenaline)
6 – 12 years	300 micrograms IM (0.3 mL)
6 months - 6 years	150 micrograms IM (0.15 mL)
< 6 months	100 – 150 micrograms IM (0.1 to 0.15 mL)

- Consider fluid replacement using colloids or crystalloids in anaphylactic shock
- IV chlorpheniramine maleate (10 mg for adult and 0.2 mg/kg for children)
- IV hydrocortisone (100 mg for adult and 2mg/kg for children)

6. Annex

Instructions for performing the 20-minute whole blood clotting test (20WBCT)

The only bedside clotting test that has been scientifically validated to detect coagulopathy in snakebite patient is the 20WBCT. Therefore, we recommend only the 20WBCT.

1. The tube used to test the 20WBCT must be made of glass (not plastic) must be clean and dry. Ideally it should also be new from soda-lime glass. Exposure to washing detergent or soap will stop the blood from clotting, a so-called false positive. We recommend that you use only disposable soda-lime glass tubes. If disposable glass tubes are not available, you can use clean glass antibiotic vials after they have been boiled with salt only, never with detergent, soap or other chemicals and dried afterwards with hot air.

2. Place about 2 mLs of venous blood in the glass tube.

3. Let it stand for 20 minutes. The glass tube with blood must be left undisturbed for 20 minutes. The tube must not be flicked or agitated while waiting for 20 minutes.

4. At 20 minutes gently invert/tip the glass tube checking for the presence of a blood clot, and this serum may run slightly down the side of the tube when gently inverted. If the tube is left for 30 minutes or longer after the blood has been placed in it, the clot may start to break down, leading to a false-positive result. Therefore, try to read the test at exactly 20 minutes.

4A. Clot present = negative test (no coagulopathy present). On gently inverting the tube, if there is any clot in the bottom the tube, the blood has clotted- a negative test. If a clot has formed after 20 minutes (a negative test), the clot will stop any whole blood from running freely down the tube. The serum may be yellow or red in colour, but does not have the denser consistency of the whole blood. In this case, you can ignore the serum on top of the clot.

4B. Clot absent = positive test (coagulopathy present). On gently inverting the tube, if the blood runs down the side of the tube, and there is no clot, it is unclotted (non-clot).

5. If there is uncertainty about the result of the 20 WBCT, a separate 20 WBCT ought to be done in parallel using blood from a healthy individual to prove that normal blood will clot after 20 minutes. This is your negative control.

5A. If blood from a healthy individual clots after 20 minutes, the finding that blood from a snake bite patient does not clot is a very significant positive result.

5B. If blood from a healthy individual clots after 20 minutes, the finding that blood from a snake bite patient also clots after 20 minutes implies that the patient does not have coagulopathy at that time.

5B. If blood from a healthy individual does not clot after 20 minutes, it is difficult to interpret the result of the 20WBCT from the patient. The most common problem here is contamination of the tube with washing using detergent or soap.

6. Note that 20 WBCT must be repeated 2-hourly for first 12 hours and 4-hourly for remaining 12 hours to detect late onset coagulopathy. Once 20 WBCT is positive, ASV administration should be considered and generally recheck 20 WBCT at 6 hours after getting ASV.

References

- Therapeutic Manual (Internal Medicine), First edition, 2016.
- Guidelines for the Management of Snakebites, WHO, 2016.
- Management of anaphylaxis for health care providers, UK resuscitation council, 2021
- White J, Mahmood MA, Alfred S, Thwin KT, Kyaw KM, Zaw A, Warrell D, Cumming R, Moody J, Eagles D, Ragas K, Dunstan N, Bacon D, Hurtado P, Peh CA. A comprehensive approach to managing a neglected, neglected tropical disease; The Myanmar Snakebite Project (MSP). Toxicon X. 2018 Dec 7;1:100001. doi: 10.1016/j.toxcx.2018.100001. PMID: 32831344; PMCID: PMC7285917.