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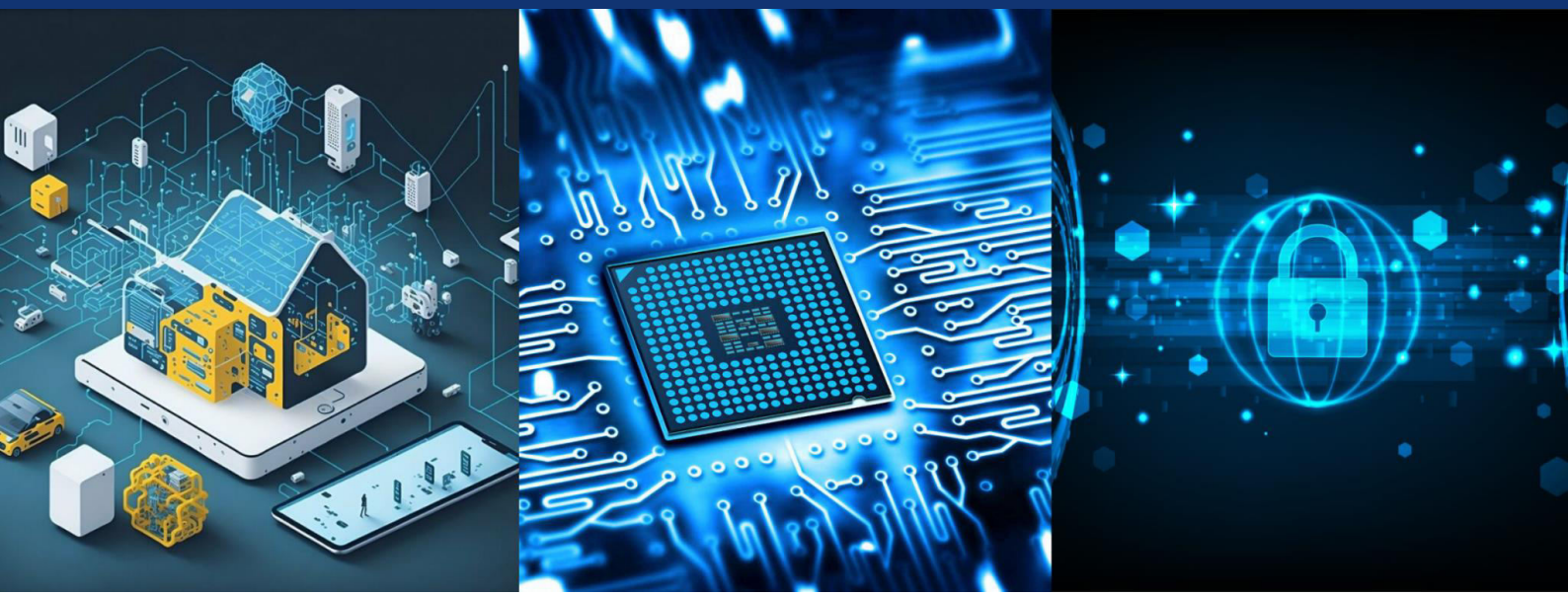

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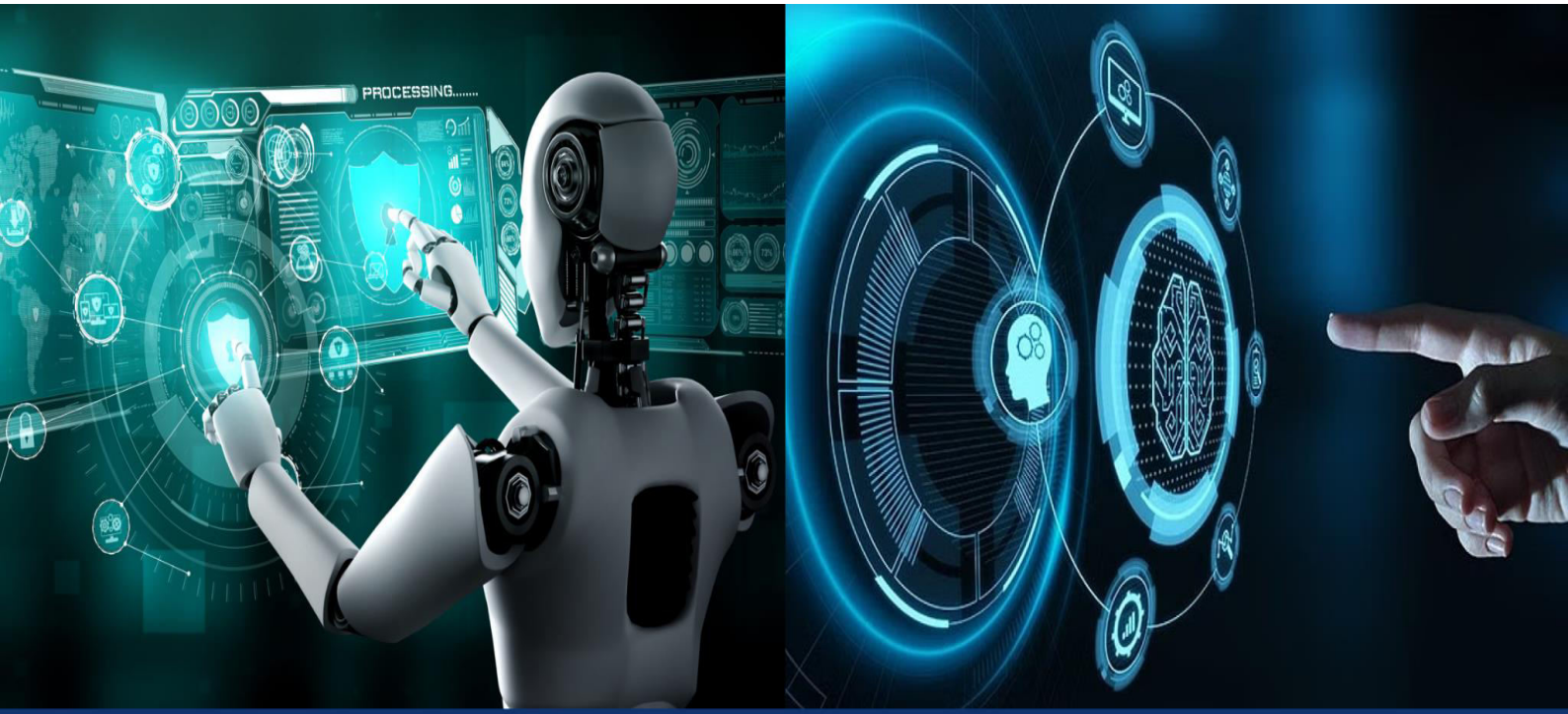

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Case Report on the Cardiac Bite of Russell Viper

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ABSTRACT: South Asia is home to many vipers. It causes a range of clinical symptoms, including headaches, diarrhoea, hypotension, respiratory and renal failure, and other neurological symptoms. Five distinct venom fractions, each of which is less lethal when tested alone, combine to determine the toxicity. Human bite symptoms and venom toxicity differ over time and among populations. Russell's viper bite can occasionally result in myocardial ischaemia and infarction. In this instance, a 20-year-old boy who was in good health and had no prior cardiac or renal issues experienced anterolateral ischaemia and severe kidney damage after being bitten by a Russell's viper. After receiving anti-snake venom and haemodialysis, he recovered in two weeks. Key words: Haemodialysis, myocardial ischaemia, acute renal damage, anti-snake venom, and snake

I. INTRODUCTION

Every year in India, snake bites claim the lives of 50,000 people.One Even though there are many different kinds of snakes, vipers, cobras, and kraits have higher rates of mortality and morbidity.2. Numerous snakes' venom can be a mixture of cytotoxins, hematotoxins, neurotoxins, and myotoxins that impact almost every organ system in the human body. Both venomous and non- venomous snake bites typically cause some local side effects. In 90% of cases, there may be mild discomfort and redness, though this varies according on where the bite occurred In addition to causing excruciating agony, a viper bite can result in local cellulitis, tissue damage, neurological issues like ptosis, convulsions, paralysis, lack of coordination, and nephrological and haematological consequences like bleeding symptoms. Cardiotoxicity is a very uncommon consequence of viper bites, occurring in less than 10% of cases.3. We describe a 20-year-old man who arrived with Russell's viper bite. with acute renal damage and cardiac ischaemia who recovered in two weeks after receiving polyvalent snake venom, haemodialysis, and other supportive treatments.

CASE REPORT

- Patient: About two hours after getting bitten by a Russell's viper while strolling through a rice field, a 35-year-old man from a rural Indian community was taken to the emergencyroom.

Initial Presentation: The patient's right lower leg, just above the ankle, was the site of the bite, and he was experiencing severe pain and swelling there. He had been bitten when he had unintentionally approached the snake, which hit him right away. He was in moderate distress when they arrived, feeling weak,dizzy,andinpain.

- Administration

Intravenous (IV) fluids were given for the patient right away in order to treat shock and avoid dehydration. The following course of treatment was started since venom-induced coagulopathy was highly likely to occur: heart rate, and respiration rate, are continuous slymonitored.
In order to maintain proper hydration and avoid shock, IV fluids (normal saline) were continued.
Although it wasn't initially necessary, blood transfusions were saved for major hemorrhages.

II. LITERATURE REVIEW

1. Russell's Viper Bites Epidemiology The Indian subcontinent, Sri Lanka, Nepal, Bangladesh, Myanmar, and portions of Southeast Asia are all home to Russell's viper. The Russell's viper is thought to be a major contributor to the 20,000 snakebite deaths that are thought to occur each year in India alone (Chaudhuri et al., 2013). People often come into close contact with the snake in its native environment in rural and agricultural settings, which is

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where most envenomations take place. Due to inadequate access to healthcare and antivenom medication, rural populations in underdeveloped regions are more vulnerable (Kumar et al., 2015).

2. The composition and mode of action of venom Russell's viper venom is complicated and contains a number of harmful substances, suchas: Metalloproteinases: These enzymes are essential for rupturing the blood vessel walls' structural integrity and causing hemorrhagic symptoms. Serine proteases are enzymes that cause coagulopathy by interfering with blood coagulation processes. L-amino acid oxidase: Causes inflammation and necrosis of local tissues. The main toxicological consequences of the venom are:

Coagulopathy: The disturbance of blood coagulation, which results in thrombocytopenia, prolonged bleeding periods, and in extreme situations, disseminated intravascular coagulation (DIC), is a characteristic of envenomation.
According to a research by Gutiérrez et al. (2009), the main reason for morbidity and death after Russell's viper bites is coagulopathy.
Renal failure: Rhabdomyolysis and direct venom nephrotoxicity are the main causes of acute kidney damage (AKI), which happens in severe envenomations (Poh et al., 2014).

3. Clinical Signs and Symptoms The location of the bite, the quantity of venom administered, and the patient's health condition all affect how a Russell's viper bite manifests clinically. Typical characteristics consist of:

Local symptoms: The initial symptoms are frequently pain, edema, and redness at the bite site. Local tissue necrosis may develop in extreme circumstances (Lai et al., 2012). Systemic signs and symptoms: Weakness, lightheadedness, and nausea are some of the early symptoms. More severe symptoms, including as bleeding (particularly from the gums, nose, and puncture site), hypotension, and shock, may appear as the venom spreads (Swaroop et al., 2009). Coagulopathy: Low fibrinogen levels, prolonged PT, and aPTT are typical diagnostic findings. According to a study conducted by Shukla et al. (2017), 60–80% of cases of

4. Diagnosis of Russell's Viper Envenomation The following criteria are used to diagnose a Russell's viper snakebite: Clinical History: It is important to consider the patient's history of snakebite in an endemic area. Two puncture marks and immediate pain and swelling are common symptoms of a Russell's viper bite. Laboratory Tests: Coagulation profile:

III. METHODOLOGY

1. Design of the Study This case study is based on a thorough retrospective examination of a single patient who needed immediate medical attention after being bitten by a Russell's viper (Daboia russelii). The clinical presentation, diagnostic procedures, treatment modalities, and patient outcome are all examined in the paper. The patient's medical records, clinical observations, and diagnostic tests performed while they were in the hospital provided the data.

2. Selection of Patients Inclusion Criteria: Based on clinical history, presentation, and geographic location (rural part of India), the patient was diagnosed with a Russell's viper snakebite.

Since early intervention is essential for improved prognosis, patients sought treatment at the hospital within six hours of the bite. adults (18 years of age and up). Patients who did not obtain the proper medical attention are excluded, including

3. Gathering Information The following methods were used to gather data:

Patient medical records: Details about the bite's history, vital signs, first symptoms, and demographics.
Clinical observations include the patient's vital signs, clinical symptoms, and systemic effects being regularly monitored while they are in the hospital. Laboratory studies included analysis of coagulation profiles (PT, aPTT, fibrinogen), complete blood counts (CBC), and renal function tests (creatinine, BUN). Records of Treatment: The treatment plan's specifics, such as the use of antivenom, analgesics, fluid resuscitation, and supportive care techniques, were documented.

4. Recognition and Diagnosis Clinical Diagnosis The following criteria were used to confirm the diagnosis of a Russell's viper snakebite:

The snakebite's history (in a rural rice field, which is characteristic of Russell's viper habitat).

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Early indications of systemic envenomation, localized edema, and bite site pain are the symptoms.

5. Antivenom Administration Treatment Protocol:

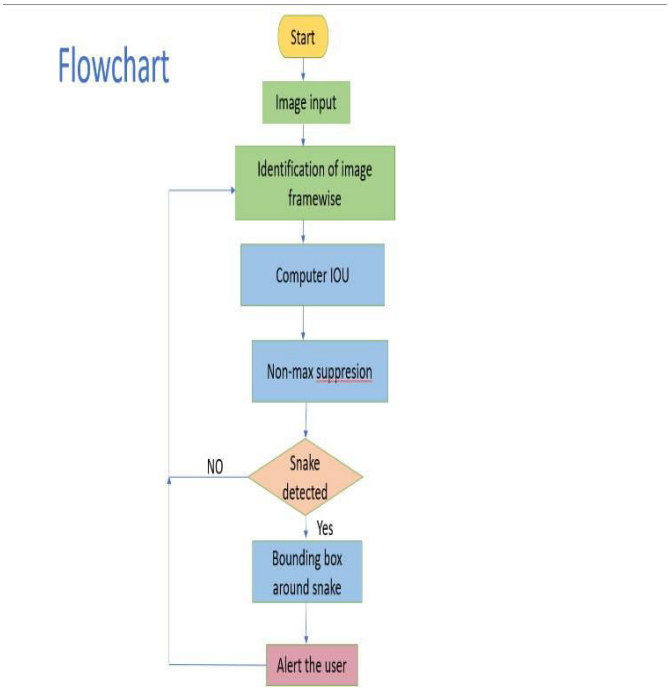
In accordance with local guidelines and the clinical severity of the bite, polyvalent antivenom was provided. Ten vials of antivenom were to be given intravenously during the first half hour following the patient's arrival.

The success of the antivenom was assessed by constantly monitoring the patient's response, which included improvements in coagulation markers, pain alleviation, and edema.

Normal saline intravenous fluids were given to treat shock and avoid dehydration.

Although not initially required, blood transfusions, fresh frozen plasma (FFP), or platelets were taken into consideration if serious bleeding issues arose.

Analgesics (paracetamol) were used to treat pain, and tetanus prevention measures were taken.



Russell Viper's Cardiac Bite

ST flattening with T-wave inversion in lead II, III, aVF, V3-V6 suggestive of inferior and lateral wall ischemia and cardiac enzymes - Trop I was positive, creatine kinase MB - 116 U/L, echo: No regional wall motion abnormalities. Bleeding time was 3 min 35 s, clotting time was 5 min 45 s, white blood cell - 19,000 cu/mm, platelet - 123,000 cu/mm and he had normal electrolytes levels. Patients renal function test was normal initially, lactic acid dehydrogenase was 803 U/L which was suggestive of rhabdomyolysis. His repeated renal function test on the subsequent day was elevated which indicated acute kidney injury and urine for myoglobin was negative.

Patient was managed with intravenous fluids, intravenous broad spectrum antibiotics, and anti- snake venom. He was initiated on hemodialysis and was given medical management for myocardial ischemia. Patient recovered in 2 weeks with all the abnormal parameters returning back to normal. Repeat ECG was normal with no old ischemic changes. (Table 1, Figures 1 and 2)

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IV. DISCUSSION

1. Clinical Presentation and Diagnosis

In this case, the patient exhibited typical symptoms of a Russell's viper bite, including immediate local pain, swelling, and erythema at the bite site. Systemic symptoms such as weakness, dizziness, and signs of coagulopathy were observed soon after the bite. The diagnosis was supported by the patient's history (encounter with a Russell's viper in a rural agricultural area), the distinctive clinical presentation, and the laboratory findings, particularly the prolonged prothrombin time (PT) and activated partial thromboplastin time (aPTT), which are indicative of venom-induced coagulopathy.

The initial symptoms of a Russell's viper bite can be nonspecific, but the presence of coagulopathy (including prolonged PT and aPTT, and low fibrinogen levels) is a hallmark of envenomation. According to Gutiérrez et al. (2009), coagulopathy is the most significant and commonly observed feature of Russell's viper bites, and this case aligns with those findings. Laboratory tests that assess coagulation and renal function (creatinine and BUN) are crucial in confirming the diagnosis and determining the severity

Table 1: Investigations

Test	Russels viper bite		
	Day 1	Day 2	Day 12
WBC count	19,500 cells/cumm	13,000 cells/cumm	8400 cells/cumm
Platelet	123,000 mm^3	126,000 mm^3	176,000 mm^3
PT and INR	C-13, T-17 INR-1.34	C-14, T-17 INR-1.21	C-13, T-16 INR-1.23
CK-MB	116 U/L	140 U/L	32 U/L
CK total	713 U/L	1336 U/L	146 U/L
Serum urea	35 mg/dl	78 mg/dl	42 mg/dl
Serum creatinine	1.0 mg/dl	3.5 mg/dl	1.3 mg/dl
Serum sodium	139 mEq/dl	133 mEq/dl	134 mEq/dl
Serum potassium	3.9 mEq/dl	4.6 mEq/dl	3.8 mEq/dl
Serum LDH	803 U/L	564 U/L	256 U/L

PT: Prothrombin time, INR: International normalized ratio, CK: Creatinine kinase, LDH: Lactate dehydrogenase

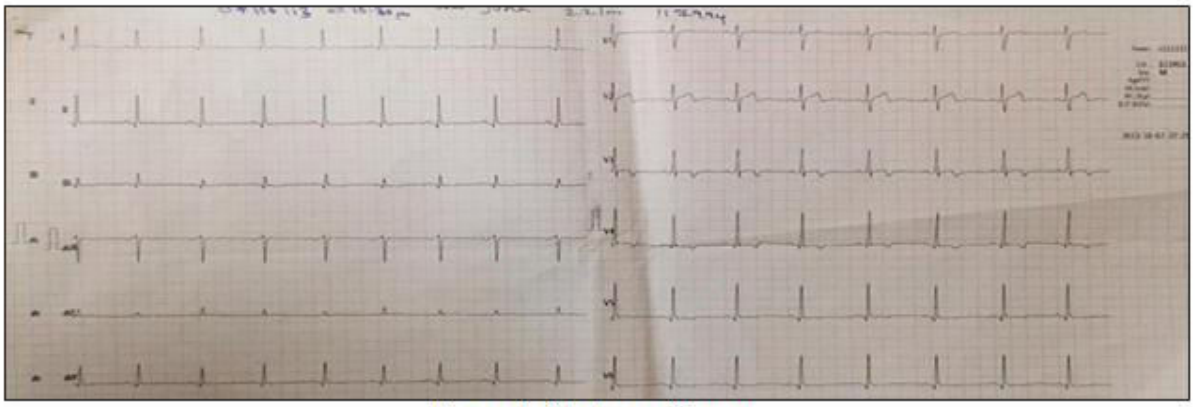

Figure 1: Electrocardiogram

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Figure 2: Bite mark: Right leg near ankle

2. Management and Treatment

The key to successful management of a Russell's viper bite lies in early intervention. In this case, antivenom was administered within 2 hours of the bite, which is critical for improving outcomes. Several studies have demonstrated that timely administration of polyvalent antivenom is effective in neutralizing venom components, preventing severe complications, and reducing mortality (Bhat et al., 2007; Bawaskar, 2004).

The choice of antivenom and its dosage is a subject of ongoing debate. Most studies, including those by Bawaskar et al. (2012), recommend administering 10-20 vials of polyvalent antivenom for moderate to severe envenomations, though the exact dose may vary depending on the severity of symptoms and the clinical response. This case used 10 vials, which is generally considered adequate for moderate envenomations, and the patient showed improvement in swelling, pain, and coagulation parameters within 24 hours.

3. Coagulopathy and Renal Failure

Coagulopathy is one of the most dangerous and characteristic features of Russell's viper envenomation, and it was observed in this case through prolonged PT and aPTT, and low fibrinogen levels. The snake's venom contains a range of enzymes that impair blood clotting by interfering with clotting factors, platelets, and fibrinogen, leading to bleeding and disseminated intravascular coagulation (DIC). This patient did not experience severe bleeding or shock, possibly due to the early administration of antivenom and fluid resuscitation, which helped mitigate the severity of coagulopathy.

V. CONCLUSION

while this case emphasizes the effectiveness of timely and appropriate medical management of Russell's viper envenomation, it also highlights the ongoing need for improved public health strategies and resources to address the complex challenges posed by venomous snakebites, especially in areas where they are most common. Timely intervention, as demonstrated in this case, significantly reduces the risk of severe complications like hemorrhage, shock, and acute kidney injury (AKI). Early administration of antivenom, ideally within 2 hours of the bite, was key to the positive outcome observed here. Additionally, fluid resuscitation,

However, challenges remain, particularly in rural and resource-poor settings, where delayed medical care and limited access to antivenom continue to contribute to high mortality rates. Strengthening healthcare infrastructure, improving access to antivenom, and educating the public on snakebite prevention and first aid are crucial steps toward reducing the burden of snakebite envenomations in endemic regions.

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- This article provides a comprehensive review of the clinical presentation, diagnostic tools, and management strategies for Russell's viper bites, including an analysis of recent treatment protocols and antivenom use.

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