# Suspected Blow to the Chest? Investigate It!

**Parisa Biazar MD[1], Catherine Mitchell MD[2], David Rosenberg MD[3]**
**1 - Family Medicine, PGY1 Resident; 2 - Emergency Medicine PGY2 Resident; 3 - Pediatrics Critical Care Attending**

## Background

- Traumatic ventral septal defects are extremely rare
- Presentation varies in timing and clinical presentation
- Currently no standard criteria to screen for blunt cardiac trauma
- EKG and troponins with transthoracic echocardiogram are best for diagnosis
- Surgical repair (either immediate or delayed) is required

## Objective

To propose that a cardiac work-up should be done on patients who present as a result of motor vehicle crashes because cardiac injury is possible with chest trauma.

## Case Report

- 16 year old male presents to the ED via EMS with a GCS of 6 and intoxicated after being found unconscious in a ditch after a motor vehicle crash.
- The patient was intubated due to low GCS. Labs were significant for alcohol level of 220 and UDS positive for cannabinoids.
- On initial exam vitals were significant for hypotension and physical exam was significant for a laceration of the right eye, lid, chin and an abrasion on the left hip. FAST negative. CT chest showed trace right pneumothorax
- Patient was extubated on HD#2 but developed tachycardia, tachypnea, increased oxygen requirements, and persistent vomiting. On re-examination, the patient had developed a new holosystolic murmur.
- Echocardiogram showed large apical VSD. Labs showed BNP 6000, Troponins 5.4, C-RP 17, WBC 18k. Chest CTA showed pulmonary artery and right ventricular enlargement suggestive of right ventricular strain, and a left ventricular aneurysm was visualized
- The patient was transferred to MUSC, and required cardiothoracic surgery to repair the ventral septal defect and left ventricular aneurysm.

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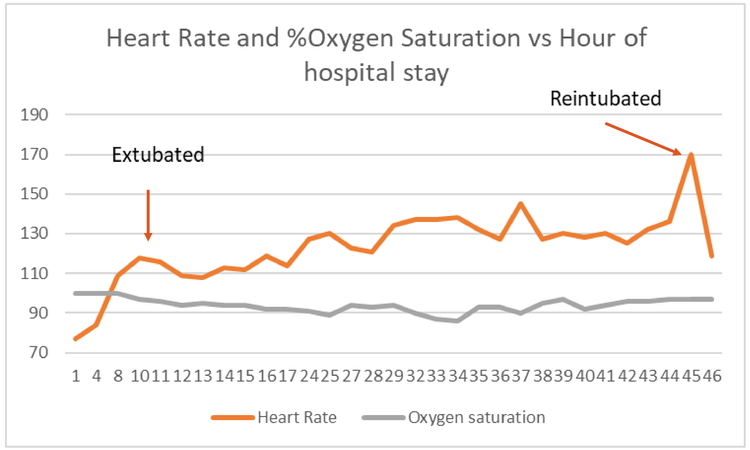
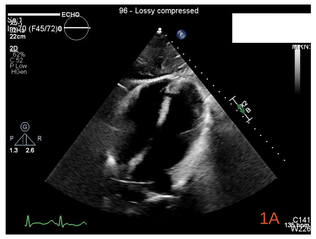
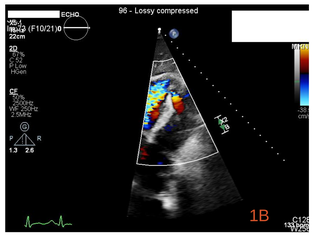
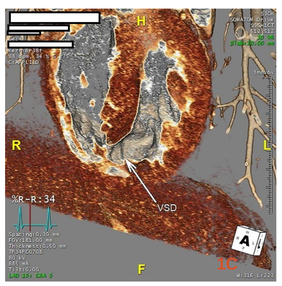
## Results

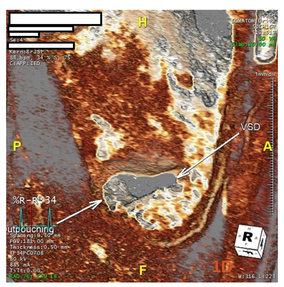


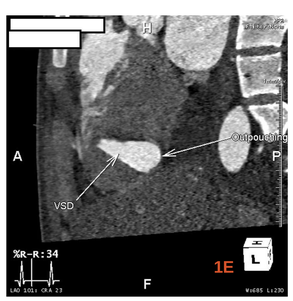

• Figure 1: Graph highlighting patients vitals throughout hospital stay. Demonstrates how patient became more tachycardic and oxygen saturation was declining.




• Image 1A-B: A and B are images of the transthoracic echocardiogram showing the apical ventral septal defect. Image B shows blood flow through the VSD.
• Image 1C-D: Images C and D are reconstructed CT images illustrating the VSD. Image D shows the left ventricular aneurysm
• Image 1E CT illustrating the VSD and left ventricular aneurysm

## Discussion

- Traumatic VSDs are very rare; occurring in < 5% of blunt cardiac trauma cases
- There is no standard criteria to screen for blunt cardiac trauma and the decision to is up to the clinician
- VSD can present immediately or days later, as in this case. The delay is thought to be due to muscular spasm or blood clot sealing the defect
- If blunt cardiac trauma is suspected, and EKG and troponin level should be obtained on initial presentation
- Troponin level of >1ng/ml is significant
- EKG findings are normal in 50% of patients with VSD but if there is pulmonary artery hypertension, EKG may show RBBB, right axis deviation, and right ventricular hypertrophy and strain
- Pediatric patients are predisposed to chest wall trauma due to a more compliant chest wall and a heart that is more anterior when compared to adults
- Patients require surgical repair which can either be emergent or delayed based on patients presentation.
- Prognosis is generally good if repaired.

## Conclusion

- We propose that if there is any concern for blunt cardiac injury, especially for those who were in a motor vehicle crash or suffered significant thoracic traumat, an initial EKG and troponin should be done
- If either of these is positive, further testing such as an echocardiogram should be performed
- This is important as patients may require emergent surgical repair

## References

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