ImaCor

hTEE™

CARDIAC

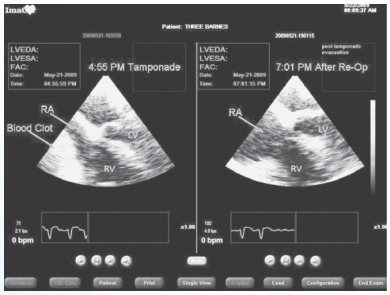
Case Report Miniseries:
hTEE™ Diagnosis and Management of Effusion and Tamponade

Michael Wall, MD, Barnes-Jewish Hospital, St. Louis, MO.
Chad Wagner, MD, Vanderbilt, Nashville, TN.
Jiri Horak, MD, Hospital of the University of Pennsylvania, Philadelphia, PA.

Hemodynamic management of the unstable patient post cardiac surgery can be very complex. In addition to maintaining cardiac filling and function by volume and pressor management, diagnosis and treatment of obstructions, pulmonary embolism and tamponade can also present a severe challenge. This brief case series will illustrate the potential of trans-esophageal (TEE) management (using the miniaturized ImaCor ClariTEE™ probe) for the diagnosis and management of effusion and tamponade post cardiac surgery.

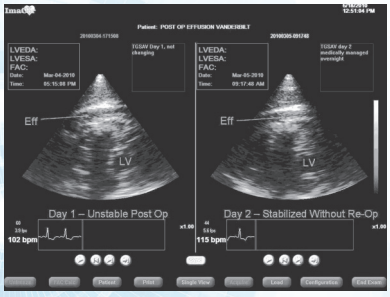
CASE 1: TEE DETECTS TAMPONADE POST-CABG NOT VISIBLE ON TTE,

Michael Wall, MD, Barnes-Jewish Hospital, St. Louis, MO. (1)

Before	Diagnosis and management with miniaturized TEE probe		After
An 86-year-old male was tachycardic and hypotensive post CABG while on Levophed (BP 80–110, SVO2 32% and CVP 25)		Visualization with ClariTEE probe revealed a large blood clot pressing on the right atrium not visible under TTE. The physician diagnosed localized tamponade as the cause of hemodynamic instability.	The right atrium filled normally, Levophed was discontinued, and the patient was hemodynamically stable (BP 140-150, HR: 70 and CVP 8).

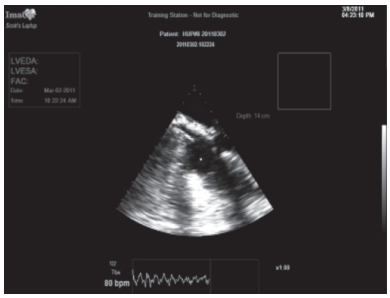
CASE 2: TEE GUIDES MEDICAL MANAGEMENT OF CARDIAC EFFUSION, AVOIDS SURGERY,

Chad Wagner, MD, Vanderbilt, Nashville, TN. (2)

Before	Diagnosis and management with miniaturized TEE probe		After
A 66-year-old male, AVR + CABG x 2. Significant bleeding and instability required multiple blood products, vasopressin infusion, and recombinant factor VIIa. Patient hemo-dynamically unstable (BP 81/45, CI 1.5, PAP 40/23).		TEE detected posterior and lateral pericardial effusion with inadequate LVEDA despite high filling pressures. Volume resuscitation continued. TEE revealed increased LVEDA despite small increase in pericardial fluid. Hemodynamic status began to stabilize. Effusion managed medically, not surgically.	Episodic TEE assessment demonstrated continued resolution of effusion, increased LVEDA, and improved hemodynamics (BP 115/65, CI 2.6, PAP 40/22). Vasoactive infusions were weaned and patient extubated, transferred to intermediate care.

CASE 3: PROACTIVE TEE DETECTS TAMPONADE IN HEMODYNAMICALLY STABLE PATIENT WITH "TIGHT CHEST," HELPS MANAGE RAPID PRESSOR WEANING,

Jiri Horak, MD, Hospital of the University of Pennsylvania, Philadelphia, PA.

Before	Diagnosis and management with miniaturized TEE probe		After
80-year-old male, MVR. Post operative complications anticipated due to bleeding. ClariTEE probe placed proactively upon arrival in CTSICU in hemodynamically stable patient.		Although the patient was hemodynamically stable and responding appropriately to fluid, TEE revealed a large thrombus behind the RA. After the thrombus was surgically removed, direct visualization of LV filling and function helped manage rapid weaning from pressors.	Patient hemodynamically stable, pressors rapidly weaned.

DISCUSSION:

1. Patients 1 and 2 were both hemodynamically unstable despite support. TEE diagnosed tamponade, requiring re-operation in patient 1 that was not evident on TTE. TEE diagnosed an effusion in patient 2, which was successfully managed medically, without re-operation, under episodic TEE monitoring over 16 hours. These cases illustrate a potentially impactful role for TEE monitoring post cardiac surgery on both sides of the question "Should I re-operate?" Ranucci's (3) risk analysis leads to the conclusion that in order to reduce morbidity and mortality, avoid re-operation if you can, but re-operate rapidly if you must.

2. Case 3 illustrates the benefits of proactive TEE assessment in an otherwise hemodynamically stable patient when complications may be expected. TEE assessment detected tamponade early, before it caused hemodynamic instability. Again, to reduce morbidity and mortality, re-operate rapidly if you must. In addition, TEE allowed rapid weaning from pressors, avoiding further potential complications.

Limitations. We have simply summarized three cases where TEE monitoring played an impactful role in managing effusion and tamponade post cardiac surgery. Although TEE monitoring led to one avoided re-operation and two rapid, staged re-operations in these cases, additional case studies are needed to quantify the clinical and economic impact of protocolizing TEE monitoring post cardiac surgery.

REFERENCES:

1. Hastings HM, Roth S, Marymount J, Boucher PE, Critical care utility of a miniaturized TEE probe for monitoring cardiac function via direct visualization: A pilot study. SCCM National Meeting, 2010.

2. Wagner CE, Bick JS, Webster BH, Selby JH, Byrne JG. Use of a miniaturized transesophageal echocardiographic probe in the intensive care unit for diagnosis and treatment of a hemodynamically unstable patient after aortic valve replacement. J Cardiothorac Vasc Anesth. 2012;26:95-97. Epub 2011 Mar 27.

3. Ranucci M, Bozzetti G, Ditta A, Cotza M, Carboni G, Ballotta A. Surgical reexploration after cardiac operations: why a worse outcome? Ann Thorac Surg. 2008;86:1557-62.

ImaCor hTEE™

ImaCor Inc.
839 Stewart Avenue Suite #3
Garden City, NY 11530

P: 516.393.0970
F: 516.393.0969
info@imacormonitoring.com