Emergency Intraoperative Echocardiography

Justiaan Swanevelder
Department of Anaesthesia, Glenfield Hospital
University Hospitals of Leicester NHS Trust, UK
“Your vision will become clear only when you can look into your heart!”

Carl Gustav Jung (1875-1961)
ASA/SCA Task Force TOE guidelines
Category I indications

- Haemodynamic lifethreatening intraop / ICU disturbances, unstable patient, evaluate LV
- Valve repair procedures
- Congenital heart surgery
- Hypertrophic obstructive cardiomyopathy repair
- Endocarditis
- Suspected thoracic aortic aneurysm, dissection in unstable patient
- Aortic dissection repair, AV involvement
- Pericardial window procedures


60 yrs old lady for MV repair

Easy separation from CPB
5 minutes post CPB - IABP
Unstable – REASON?

for adult patients without contraindications, TEE should be used in all open heart (e.g. valvular procedures) and all thoracic aortic surgical procedures, and should be considered in CABG surgeries as well"
“…………to confirm or further define the preoperative diagnosis, exclude any new deterioration or unsuspected pathology, facilitate the intra-operative management of the patient, including where necessary to aid in surgical planning, and to evaluate the results of surgery and provide information for the postoperative care”

“we concur that TOE is reasonable for use in all adult patients who are undergoing either cardiac surgery or thoracic aortic surgical procedures under general anaesthesia.”
Assessing ventricular performance

Ng A, Swanevelder J. Perioperative monitoring of left ventricular function: what is the role of recent developments in echocardiography? Br J Anaesth 2010:104:669-72
normal LV – PAFC correlates well with TOE
LV dysfunction/extremes of preload, poorly assessed without echo – UNCOUPLING P / V
assessment with PAFC bad in those who need it most!

LV function - Quantitative Assessment

LV volume reduction surgery

LV function - Quantitative Assessment

LV volume reduction surgery

3 D volumes and EF


And by the way!
78 yr. frail gentleman – for CABG ±MVR

poor general health

cardiac catheter: 3-VD and mild MR
CABG only - Cx, LAD, small RCA
technical difficulties
try to come off CPB with IABP

- Inotropes!
- GTN
CABG only - Cx, LAD, small RCA
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try to come off CPB with IABP

- Inotropes!
- GTN
Back on CPB

- RCA graft
- Regrafted Cx
63 yrs old male – post MV repair

poor LV following surgery
high dose inotropes
increase in inotropes

Why hypotensive?

Treatment options?
63 yrs old male – post MV repair

IABP difficult to advance

Should it be advanced any further?
60 yrs old male with severe AR, asc aorta 36 mm

Stented bioprosthetic valve
Immediate postop – TOE not performed
Concerns about left radial arterial line
2hrs post surgery – anuric on CICU, hemodynamically unstable

Intra-operative TOE not strongly indicated
(Class II indication-2003 ACC/AHA/ASE guidelines)
61 yr old female, severe MR for repair
61 yr old female, severe MR for repair

Separation from CPB!
65 yr old male, routine CABG

Separation from CPB!

Intra-operative TOE not strongly indicated
(Class II indication-2003 ACC/AHA/ASE guidelines)
60 yr old female, severe AR for AVR

Intra-operative TOE not strongly indicated
(Class II indication-2003 ACC/AHA/ASE guidelines)

21mm stented bioprosthetic valve
Separation from CPB

MV regurgitation

Excision P3 scallop, rigid annuloplasty ring

MV regurgitation

Calcified annulus, para-prosthesis leak

Aortic stenosis - AVR

Calcified annulus – 19 bioprosthesis
Aortic stenosis - AVR

Calcified annulus, 19 bioprosthetic valve, para-prosthetic leak

Aortic stenosis - AVR

Calcified annulus, 19 bioprosthesis, para-prosthesis leak

80 yr old female urgent CABG, MVR

- From peripheral hospital
- MS, MR, critical LAD stenosis - recent deterioration
- permanent pacemaker - complete heart block

PRE-OPERATIVE ECHO IN REFERRING HOSPITAL
Intraoperative TOE findings - ALSO

- Calcified aortic valve - severe AS (mean PG 40 mm Hg), mild AR
- Severe TR
- Biventricular hypertrophy
- Impaired LV function
Intraoperative TOE findings

• Left atrial size > 5 cm
• Large thrombus in left atrial appendage
Cannulation for bypass - unexpected event

- sudden appearance of dislodged thrombus in LA
- passed through MV, LVOT and AV
- located in ascending aorta
Cannulation for bypass - unexpected event

- Disappearance of thrombus from ascending aorta
- Patient became unstable
- Immediately on CPB
Surgical procedure

- MVR, TV repair
- Single venous graft to LAD
- Difficulty off CPB – unstable
- IABP, inotropic support, pacing
- All pulses palpable

Vascular scan - right common carotid artery!
Operator dependent – training issues?

“Training pyramid”

TRAINED OPERATORS

TRAINING IN PROGRESS

MINIMALLY TRAINED OPERATORS


Future: peri/intraoperative echocardiography for all high-risk surgical patients?

Ng A, Swanevelder J. Perioperative echocardiography for non-cardiac surgery: what is its role in routine haemodynamic monitoring?

Br J Anaesth 2009;102:731-4
If we don’t look, we won’t see, we won’t understand!
Assisting/Guiding the surgeon
Improving patient care

University Hospitals of Leicester
NHS Trust
Thank you