Echo pearls: Highlights from the echocardiographic literature 2011

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The literature highlights from the echocardiographic literature for 2011 will focus on the following major topics:

- Right ventricular function and its echocardiographic assessment after cardiac surgery
- Comparability of echocardiographic equipment from different manufacturers
- Assessment of mitral valve area after mitral valve repair
- Echo guidelines
- Bedside echocardiography
- Transcatheter valve intervention

Right ventricular function and its echocardiographic assessment after cardiac surgery

Besides the fact that the echocardiographic assessment of right ventricular function is generally a challenging task, its measurement after cardiac surgery seems to be even more complicated. There is some concern whether postoperative measures of RV function can be compared with preoperative values considering the impact of surgery. Several papers question the absolute values of tricuspid annular peak systolic excursion (TAPSE) and peak systolic velocity (PSV) of the lateral annulus. It has been shown that these measurements of longitudinal contraction are and remain reduced after cardiac surgery in patients with preserved or recovered right ventricular function as measured by right ventricular ejection fraction (RVEF). This might, among others, be the effect of geometrical changes to the right ventricle induced by the postoperative loss of the pericardial support to the right ventricle. At present, it seems to be appropriate to rely on echocardiographic parameters of global right ventricular function in patients after cardiac surgery and not to compare pre- and postoperative measurements of longitudinal contraction.

Ref 1. A randomized comparison of right ventricular function after on-pump versus off-pump coronary artery bypass graft surgery.
Michaux I, Filipovic M, Skarvan K, Bolliger D, Schumann R, Bernet F, Seeberger MD.
J Thorac Cardiovasc Surg. 2011 Feb; 141(2): 361-7.

Comment: In this study including 50 patients, the late effects (3 months after surgery) of on-pump versus off-pump surgery on RV function were studied. Right ventricular myocardial performance index and right ventricular fractional area change did not change in compared with the baseline values in both groups. Peak systolic velocity of the lateral tricuspid annulus was decreased significantly in both groups 3 months after the operation and no difference between the groups was found. This finding suggests that peak systolic velocity of the lateral wall is always decreased after opening of the pericardium.

Ref 2. Is right ventricular systolic function reduced after cardiac surgery? A two- and three-dimensional echocardiographic study.
Tamborini G, Muratori M, Brusoni D, Celeste F, Maffessanti F, Caiani EG, Alamanni F, Pepi M.
Eur J Echocardiogr 2009; 10: 630-34

Comment: In this study including 40 patients undergoing mitral valve repair, the late effects on RV function at 3, 6 and 12 month after surgery were compared. RVEF measured with 3D echo was compared to TAPSE and peak systolic velocity (PSV) of the tricuspid annulus. While TAPSE and PSV were significantly lower at all times after surgery, 3D-RVEF did not change postoperatively. This finding suggests that geometrical rather than functional changes of the right ventricle are responsible for the reductions in TAPSE and PSV postoperatively.

Ref 3. Echocardiographic right ventricle longitudinal contraction indices cannot predict ejection fraction in post-operative Fallot children.
Bonnemains L, Stos B, Vaugrenard T, Marie PY, Odille F, Boudjemline Y.
Eur J Echocardiogr 2012; 13: 235-242

Comment: In this study, RVEF assessed by MRI, was compared to the following echocardiographic RV function parameters: TAPSE, strain and strain rate, both for RV free wall and whole RV. The patient group were 35 children, years post-operative after Fallot repair. The control group were 20 young adults without previous surgery and RVEF > 50% in the MRI. In the control group, the echocardiographic estimate of the RVEF by echo was valid with a specificity > 0.95. In the postoperative Fallot children, the probability of correct prediction of RVEF was 54% for TAPSE, 59-62% for strain and 57-63% for strain rate, with the better values from the RV free wall only. This finding suggests that longitudinal contraction may be impaired after pericardectomy.

Comparability of echocardiographic equipment from different manufacturers

Although there have always been differences in the performance of echocardiographic equipment from different manufacturers regarding the expression of the images in the 2D and Doppler modes, these differences have rarely been perceived as determining the correctness of echocardiographic interpretations. Recent progress by manufacturers, such as tissue Doppler and speckle tracking measurements heavily relying on technical developments, have used different technological approaches and uniform standards have not been developed. Studies comparing equipment from different manufacturers for tissue Doppler and speckle tracking measurements have found inaccurate and incomparable measurements when using phantoms or comparing analysis of identical datasets. These results exclude the development of standard and normal values for these measurements and their clinical use. At present, the numerical values of tissue Doppler recordings remain questionable, requiring follow up measurements to be performed with identical equipment. The high variability of 2D and 3D speckle tracking measurements depending on inter-vendor and methodical variations including missing standards cautions against its clinical use.

Ref 1. Evaluation of tissue Doppler-based velocity and deformation imaging: a phantom study of ultrasound systems.
Martensson Mattias, Bjällmark Anna, Brodin Lars-Ake.
Eur J Echocardiogr 2011; 12: 467-476

Comment: Using a dynamic phantom model enabling tissue Doppler measurement of displacement, velocity, strain and strain rate, four US scanner models of different manufacturers were tested. In addition, two different scanners of the same model were compared, and one scanner acquisition was compared on two generations of the same work station.

While 4 of 6 velocity results and three of 6 displacement results were accurate, strain results were only acceptable in 3 of 6 systems. No system generated acceptable strain rate results. This finding suggests that US scanner systems including work stations need to be evaluated before introduction into clinical practice for tissue Doppler measurements.

Ref 2. Reproducibility and inter-vendor variability of left ventricular deformation measurements by three-dimensional speckle-tracking echocardiography.
Gayat E, Ahmad H, Weinert L, Lang RM, Mor-Avi V.
J Am Soc Echocardiogr 2011; 24: 878-885

Comment: Real-time full volume 3 D datasets taken in 30 subjects with normal systolic function obtained with two vendors' equipment where compared for agreement and reproducibility using two software packages. For all combinations, inter-technique agreement was poor and always beyond intrinsic variability. The results were worse when different analysing software was used. This finding suggests that 3D speckle tracking LV deformation parameters are highly vendor dependent and limit the clinical use and comparability.

Ref 3. Comparison of two different speckle tracking software systems: does the method matter?
Biaggi P, Carasso S, Garceau P, Greutmann M, Gruner C, Tsang W, Rakowski H, Agmon Y, Woo A.
Echocardiography 2011; 28: 539-547

Comment: 2D speckle tracking and velocity vector imaging were compared in 47 healthy subjects measuring peak strain and time to peak strain (TTP). While TTP strain as well as strain gradients were comparable between the two methods, most peak strain values were not. This finding suggests that the software dependency of peak strain values limits its clinical application.

Assessment of mitral valve area after mitral valve repair

The intra-operative assessment of mitral valve area (MVA) after mitral valve repair for mitral insufficiency is important for excluding newly occurring mitral valve stenosis due to the repair. Several echocardiographic methods are available for this approach. The pressure half-time method (PHT) is simple to perform, but was developed for assessment of mitral stenosis in rheumatic valve disease. MVA by planimetry in 2 D TOE is very dependent on image quality and prone to overestimation. PISA method and even more MVA by continuity equation are complicated and more likely to add up errors during calculations. The assessment of gradients is highly dependent on postoperative haemodynamics. Although the results of recent studies are not completely consistent and in some sections contradictory, they allow the following conclusions for the intra-operative assessment of MVA after mitral valve repair:
Whenever it can be assured that adequate haemodynamics (stroke volume) are obtained at the time of TOE measurements, the transmyocardial pressure gradients give the best assessment for the MVA. Mean gradients ≥ 7 mm Hg and peak gradients ≥ 17 mm Hg separate clinical significant mitral valve stenosis. Intra-operative data on the PISA method are missing. This methods shows reliable results in postoperative TTE examinations. The MVA by continuity equation seems to be feasible in most studies, but clearly is most laborious and difficult to perform. MVA by planimetry is often used as the gold standard in studies and seems reliable if imaging is adequate. Most study results point out that the assessment of MVA by PHT is not reliable and does not correlate well with the clinical result. PHT seems to be influenced by an abnormal atrioventricular compliance.

Ref 1. Mitral valve area by the pressure half-time method does not correlate with mean gradient in mitral valve repair patients.
House CM, Nelson WB, Nickele GA, Ahmed I, Dahiya R.
Eur J Echocardiogr 2011; 12: 124-130

Comment: In this retrospective study in 42 patients undergoing mitral valve repair for chronic mitral regurgitation, measurements of mitral valve area (MVA) by pressure half-time (PHT) were compared to MVA by continuity equation and to mean diastolic gradient using the simplified Bernoulli equation on the mitral valve inflow pattern. While MVA by continuity equation correlated with mean gradient and annuloplasty ring size used, no correlation was found when MVA was measured by PHT. This finding suggests that the PHT method should not be used to assess MVA after mitral valve repair. Gradients and MVA by continuity equation do correlate with the effect of the surgical result on haemodynamics.

Ref 2: Comparison of mitral valve area by pressure half-time and proximal isovelocity surface area method in patients with mitral stenosis: effect of net atrioventricular compliance.
Omar AMS, Tanaka H, AbdelDayem TK, Sadek AS, Raslaan H, Al-Sherbiny A, Yamawaki K, Ryo K, Fukuda Y, Norisada K, Tatsumi K, Onishi T, Matsumoto K, Kawai H, Hirata K.
Eur J Echocardiogr 2011; 12: 283-290

Comment: In this study on 51 patients with mitral stenosis, mitral valve area measured by PHT and PISA was compared to MVA by planimetry as gold standard. Atrioventricular compliance (Cn) was calculated from 2D echo. MVA by PISA correlated closely to MVA by planimetry, as did MVA by PHT in patients with normal Cn. MVA by PHT correlated not as well in patients with abnormal Cn. This finding suggests that PHT is affected by changes in Cn and not recommended in extreme Cn values.

Ref 3. Intraoperative assessment of mitral valve area after mitral valve repair: comparison of different methods.
Maslow A, Gemignani A, Singh A, Mahmood F, Poppas A.
J Cardiothorac Vasc Anesth 2011; 25: 221-228

Comment: In this prospective study, the echocardiographic measurements of mitral valve area by PHT, 2D planimetry and continuity equation in 25 consecutive patients undergoing mitral valve repair for severe mitral insufficiency were compared. Data were obtained intra-operatively (TOE) after repair, at hospital discharge (TTE) and 6 to 12 months after surgery (TTE). There was good agreement within and between each time period between MVA obtained by PHT and 2D planimetry. Mitral valve area by continuity equation in the postoperative period (TTE) did not correlate or agree as well with other MVA data. This finding suggests that MVA measurements by PHT and 2D planimetry correlate better intra-operatively and postoperatively compared to MVA by continuity equation. It remains unclear how much altered haemodynamics (significantly increased LVEF in the TTE examinations) contributed to the difference in the MVA obtained by continuity equation by TTE.

Ref 4. Evaluation of transmitral pressure gradients in the intraoperative echocardiographic diagnosis of mitral stenosis after mitral valve repair.
Riegel AK, Busch R, Segal S, Fox JA, Eltzschig HK, Shernan SK.
PLoS ONE 2011; 6(11): e26559

Comment: In this retrospective review of 552 consecutive patients undergoing mitral valve repair, post-bypass intra-operative TOE examinations were screened for peak and mean transmitral pressure gradients (TMPG) and pressure half time measurements. Nine patients needing re-operation for primary mitral stenosis showed significantly increased mean and peak TMPG, whereas PHT only weakly

predicted mitral stenosis and showed considerable variation. This finding suggests that TMPG (mean ≥ 7 mm Hg and peak ≥ 17 mm Hg) best separates patients with clinical significant mitral stenosis after mitral valve repair, while PHT measurements are a weak predictor.

Ref 5. Transesophageal echocardiography during mitral valve repair underestimates mitral valve area by pressure half-time calculation
Poh KK, Hong ECT, Yang H, Lim YT, Yeo TC.
Int J Cardiol 2006; 108: 177-180

Comment: In this retrospective study in 36 patients, mitral valve area by PHT from intraoperative TOE was compared to postoperative PHT TTE measurements several weeks later. Intra-operative PHT underestimated MVA by TTE on average by 0.6 cm^2. This finding suggests that one should not rely on the single assessment of MVA by PHT intra-operatively to judge adequacy of MVR.

Ref 6. Echocardiographic evaluation of the mitral valve area before and after percutaneous mitral commissurotomy: the pressure half-time method revisited.
Messika-Zeitoun D, Meizels A, Cachier A, Scheuble A, Fondard O, Brochet E, Cormier B, Iung B, Vahania A.
J Am Soc Echocardiogr 2005; 18: 1409-1414

Comment: In this prospective study on 120 patients undergoing percutaneous mitral commissurotomy (PMC) for severe mitral stenosis, MVA measured by PHT was compared to MVA by 2D planimetry as reference before and after the procedure. While the PHT before PMC showed only a fair correlation to 2D MVA, the correlation was poor after PMC. This finding suggests that the PHT method should not be used to assess the effects of PMC on mitral valve area.

Echo guidelines

Vascular access

1. Councils on Intraoperative Echocardiography and Vascular Ultrasound of the American Society of Echocardiography. Special articles: guidelines for performing ultrasound guided vascular cannulation: recommendations of the American Society of Echocardiography and the Society of Cardiovascular Anesthesiologists.
Troianos CA, Hartman GS, Glas KE, Skubas NJ, Eberhardt RT, Walker JD, Reeves ST.
Anesth Analg. 2012; 114(1): 46-72. PubMed PMID: 22127816.

Comment: Ultrasound-guided vascular access has been shown to improve patient care. Therefore, the use of ultrasound is recommended for the placement of all central venous catheters. In this document, recommendations for the ultrasound-guided central venous access for the internal jugular vein, the subclavian vein and femoral vein are given based on the strength of the scientific evidence in the literature. It also includes the role of ultrasound in guiding vascular access in the paediatric population, in arterial and peripheral venous cannulation, and the role in training and simulation.

3D-TOE

2. EAE/ASE recommendations for image acquisition and display using three-dimensional echocardiography.
Lang RM, Badano LP, Tsang W, Adams DH, Agricola E, Buck T, Faletra FF, Franke A, Hung J, de Isla LP, Kamp O, Kasprzak JD, Lancellotti P, Marwick TH, McCulloch ML, Monaghan MJ, Nihoyannopoulos P, Pandian NG, Pellikka PA, Pepi M, Roberson DA,Shernan SK, Shirali GS, Sugeng L, Ten Cate FJ, Vannan MA, Zamorano JL, Zoghbi WA.
J Am Soc Echocardiogr. 2012; 25(1): 3-46. PubMed PMID: 22183020.
Eur Heart J Cardiovasc Imaging. 2012; 13(1): 1-46. PubMed PMID: 22275509.

Comment: The main goal of this document (published in two journals) is to provide a practical guide on how to acquire, analyse and display the various cardiac structures using 3D echocardiography, as well as the limitations of the technique. The standard examination protocols for transthoracic and transoesophageal echocardiography are based on current echo machines and on-cart software.

Equipment cleaning and disinfection

3. Guidelines for transoesophageal echocardiographic probe cleaning and disinfection from the British Society of Echocardiography.
Kanagala P, Bradley C, Hoffman P, Steeds RP.
Eur J Echocardiogr. 2011; 12(10): i17-23.
PubMed PMID: 21998464.

Comment: There is little evidence relating to infection control within TOE, so the information provided represents a consensus of opinion. There are effectively two procedures possible within this document, a wipe-based disinfection system and a process based on automated processor disinfection. Sheaths are subject to perforation which may be undetectable to the naked eye. Perforation rates as high as 4.4% have been reported and may require a post-use air tightness test to confirm maintenance of structural integrity. Therefore, TOE probes should undergo the same decontamination whether or not a sheath is used.

Research

4. Recommendations of the European Association of Echocardiography: how to use echo-Doppler in clinical trials: different modalities for different purposes.
Galderisi M, Henein MY, D'hooge J, Sicari R, Badano LP, Zamorano JL, Roelandt JR.
Eur J Echocardiogr. 2011; 12(5): 339-53.
PubMed PMID: 21555455.

5. A suggested roadmap for cardiovascular ultrasound research for the future.
Kaul S, Miller JG, Grayburn PA, Hashimoto S, Hibberd M, Holland MR, Houle HC, Klein AL, Knoll P, Lang RM, Lindner JR, McCulloch ML, Metz S, Mor-Avi V, Pearlman AS, Pellikka PA, DeMars Plambeck N, Prater D, Porter TR, Sahn DJ, Thomas JD,
Thomenius KE, Weissman NJ.
J Am Soc Echocardiogr. 2011; 24(4): 455-64.
PubMed PMID: 21440216.

Comment: These two position papers from experts in echocardiography (clinicians, physician-scientists active in the field of cardiovascular ultrasound, ultrasound physicists, and engineers from the various ultrasound companies) give recommendations to assist clinical researchers in the design, implementation, and conduction of echocardiographic protocols for clinical trials and to guarantee their quality. Selected areas of research necessary in this decade that will meet our future clinical needs were identified.

Echo criteria/indications

6. 2011 Appropriate Use Criteria for Echocardiography.
A Report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, American Society of Echocardiography, American Heart Association, American Society of Nuclear Cardiology, Heart Failure Society of America, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Critical Care Medicine, Society of Cardiovascular Computed Tomography, and Society for Cardiovascular Magnetic Resonance Endorsed by the American College of Chest Physicians.
J Am Coll Cardiol. 2011; 57(9): 1126-66.
PubMed PMID: 21349406.

Comment: The 202 indications in this document were developed by a diverse writing group and scored by a separate independent technical panel to designate appropriate use,

uncertain use, and inappropriate use. Ninety-seven indications were rated as appropriate. In general, the use of echocardiography for initial diagnosis when there is a change in clinical status or when the results of the echocardiogram are anticipated to change patient management were rated appropriate.

Echo reporting

7. Recommendations for reporting perioperative transoesophageal echo studies.
Feneck R, Kneeshaw J, Fox K, Bettex D, Erb J, Flaschkampf F, Guarracino F, Ranucci M, Seeberger M, Sloth E, Tschernich H, Wouters P, Zamorano J; European Association of Cardiothoracic Anaesthesiologists (EACTA) and the European Association of Echocardiography (EAE).
Eur J Echocardiogr. 2010; 11(5): 387-93. PubMed PMID: 20530602.

Comment: The need for guidance in producing peri-operative TOE reports has been highlighted by the development of the TOE accreditation process developed jointly by the European Association of Echocardiography (EAE) and the European Association of Cardiothoracic Anesthesiologists (EACTA). This document aims to provide guidance for physicians on the content and structure of a peri-operative TOE report and in addition is helpful in preparing the logbook for TOE accreditation.

Cardiac mechanics/function

8. Current and evolving echocardiographic techniques for the quantitative evaluation of cardiac mechanics: ASE/EAE consensus statement on methodology and indications endorsed by the Japanese Society of Echocardiography.
Mor-Avi V, Lang RM, Badano LP, Belohlavek M, Cardim NM, Derumeaux G, Galderisi M, Marwick T, Nagueh SF, Sengupta PP, Sicari R, Smiseth OA, Smulevitz B, Takeuchi M, Thomas JD, Vannan M, Voigt JU, Zamorano JL.
Eur J Echocardiogr. 2011; 12(3): 167-205. PubMed PMID: 21385887.

Comment: Two techniques have dominated the research arena of echocardiography: (1) Doppler-based tissue velocity measurements, frequently referred to as tissue Doppler or myocardial Doppler, and (2) speckle tracking on the basis of displacement measurements. Both types of measurements lend themselves to the derivation of multiple parameters of myocardial function. The goal of this document is to focus on the currently available techniques that allow quantitative assessment of myocardial function via image-based analysis of local myocardial dynamics, including Doppler tissue imaging and speckle-tracking echocardiography, as well as integrated back- scatter analysis.

Bedside echocardiography

1. Diagnostic accuracy of a hand-held ultrasound scanner in routine patients referred for echocardiography.
Prinz C, Voigt JU.
J Am Soc Echocardiogr. 2011; 24(2): 111-6. PubMed PMID: 21126857.

Comment: Patients (n=349) were scanned with hand-held ultrasound and high-end echocardiography. Segmental endocardial border delineation was scored to describe image quality and LV dimensions, regional and global LV function, and grades of valve disease were compared.
The mean endocardial visibility grades were comparable as well as regional wall motion score, ejection fraction and LV measurements. No pericardial effusion or valve stenosis was missed. Regurgitations missed by hand-held ultrasound were all graded „minimal“ on high-end echocardiography. Hand-held echocardiography was feasible and missed no relevant findings.

2. Feasibility and reliability of point-of-care pocket-sized echocardiography.
Andersen GN, Haugen BO, Graven T, Salvesen O, Mjølstad OC, Dalen H.
Eur J Echocardiogr. 2011; 12(9): 665-70. PubMed PMID: 21810825.

Comment: The study was performed by cardiologists on a medical ward. Assessments of global and regional LV function, RV function, valvular function, left atrial size, the pericardium and pleura were done including measurements of inferior vena cava and abdominal aorta. Point-of-care semi-quantitative evaluation of cardiac anatomy and function showed high feasibility and correlation with the reference method for most indices.

3. Three years' experience of focused cardiovascular ultrasound in the peri-operative period.
Cowie B.
Anaesthesia. 2011; 66(4): 268-73. PubMed PMID: 21401539.

Comment: This study assessed the indications, impact on clinical management and accuracy of focused cardiovascular ultrasound performed by anaesthetists in the peri-operative period. One hundred and seventy patients over a 3-year period had a focused transthoracic echocardiogram. The undifferentiated systolic murmur was the commonest indication (58%). Some degree of aortic stenosis was present in 26% of patients; mitral valve disease (18%)) and pulmonary hypertension (14%)) were also common. Changes in peri-operative management occurred in 82% of the patients and major findings correlated with a formal cardiology transthoracic echocardiogram in 92% of the patients. Focused cardiovascular ultrasound performed by anaesthetists in the peri-operative period accurately detects major cardiac pathology and significantly alters peri-operative management.

4. Evaluation of systolic murmurs using transthoracic echocardiography by anaesthetic trainees.
Cowie B, Kluger R.
Anaesthesia. 2011; 66(9): 785-90. PubMed PMID: 21707561.

Comment: This study aimed to assess the ability of echocardiography naive trainee anaesthetists to recognize and assess the severity of aortic stenosis after a set amount of training. Five trainees underwent 2 h of didactic and hands-on teaching in evaluation of the aortic valve, after which they scanned 20 patients each. Their results were compared with those obtained by an experienced cardiac anaesthetist with echocardiography training and qualifications. There was 100% concordance between trainees and the consultant for assessment of clinically significant aortic stenosis, with no cases of misdiagnosis.

5. The role of routine pre-operative bedside echocardiography in detecting aortic stenosis in patients with a hip fracture.
Loxdale SJ, Sneyd JR, Donovan A, Werrett G, Viira DJ.
Anaesthesia. 2012; 67(1): 51-4. PubMed PMID: 22023667.

Comment: The prevalence and severity of aortic stenosis in unselected patients admitted with a hip fracture is unknown. In a prospective study of 374 patients, 2% had severe and 6% had moderate aortic stenosis. 31% of the patients with no murmur detected clinically on admission had aortic stenosis on echocardiography. If a murmur was heard then the likelihood of the lesion's being moderate or severe aortic stenosis was increased.

6. Bedside hand-carried ultrasound by internal medicine residents versus traditional clinical assessment for the identification of systolic dysfunction in patients admitted with decompensated heart failure.
Razi R, Estrada JR, Doll J, Spencer KT.
J Am Soc Echocardiogr. 2011; 24(12): 1319-24. PubMed PMID: 21885245.

Comment: Internal medicine residents with limited training in cardiac ultrasound (20 practice studies) were able to identify LV systolic dysfunction (EF < 40%) in patients with acute decompensated heart failure with superior accuracy compared with clinical, physical exam, lab, and electrocardiographic findings.

7. Cardiopulmonary limited ultrasound examination for „ quick-look" bedside application.
Kimura BJ, Yogo N, O'Connell CW, Phan JN, Showalter BK, Wolfson T.
Am J Cardiol. 2011; 108(4): 586-90. PubMed PMID: 21641569.

Comment: In 1,016 consecutive echocardiograms the prognostic value of a cardiopulmonary limited ultrasound examination was assessed using 4 simplified diagnostic criteria that would screen for left ventricular dysfunction (LV), left atrial (LA) enlargement, inferior vena cava plethora (IVC+), and ultrasound lung comet-tail artifacts (ULC) in patients referred for echocardiography (78% were in-hospital patients). LV dysfunction (16%), LA enlargement (53%), IVC+ (34%), and ULC (28%) were seen in the population of inpatients. The best multivariate logistic model contained 3 predictors of in-hospital mortality: ULC, IVC+ and male gender. It was concluded that the four "quick-look" signs contained prognostic information.

8. Diagnostic influence of cardiovascular screening by pocket-size ultrasound in a cardiac unit.
Skjetne K, Graven T, Haugen BO, Salvesen Ø, Kleinau JO, Dalen H.
Eur J Echocardiogr. 2011; 12(10): 737-43. PubMed PMID:21821611.

Comment: A hand-held ultrasound cardiovascular examination assessed vascular and cardiac anatomy and function accurately and enabled correction of the diagnosis in 16% of patients admitted to a cardiac unit. In 55% of the participants, the cardiovascular ultrasound screening had important diagnostic influence.

Transcatheter valve intervention

1. EAE/ASE recommendations for the use of echocardiography in new transcatheter interventions for valvular heart disease.
Zamorano JL, Badano LP, Bruce C, Chan KL, Gonçalves A, Hahn RT, Keane MG, La Canna G, Monaghan MJ, Nihoyannopoulos P, Silvestry FE, Vanoverschelde JL, Gillam LD, Vahanian A, Di Bello V, Buck T; Document Reviewers: European Association of Echocardiography (EAE): American Society of Echocardiography (ASE): The ASE Guidelines and Standards Committee and the ASE Board of Directors.
Eur J Echocardiogr. 2011; 12(8): 557-84. PubMed PMID: 21841044.
Eur Heart J. 2011; 32(17): 2189-214. PubMed PMID: 21885465.
J Am Soc Echocardiogr. 2011; 24(9): 937-65. PubMed PMID: 21867869.

Comment: The EAE in partnership with the ASE developed recommendations for echocardiography in new transcatheter interventions for valvular heart disease (published in three journals). The echocardiographic assessment in transcatheter aortic valve implantation (TAVI), mitral valve repair and closure of prosthetic paravalvular leaks extends from patient selection to intra-procedural monitoring and post-procedural follow-up. Differences between TTE en TOE in annular sizing of the severe stenotic aortic valve are addressed. The role of 3D-TTE in TAVI is limited, but 3D-TOE is rapidly expanding.

2. Transcatheter versus surgical aortic-valve replacement in high-risk patients.
Smith CR, Leon MB, Mack MJ, Miller DC, Moses JW, Svensson LG, Tuzcu EM, Webb JG, Fontana GP, Makkar RR, Williams M, Dewey T, Kapadia S, Babaliaros V, Thourani

VH, Corso P, Pichard AD, Bavaria JE, Herrmann HC, Akin JJ, Anderson WN, Wang D, Pocock SJ; PARTNER Trial Investigators.
N Engl J Med. 2011; 364(23): 2187-98. PubMed PMID: 21639811.

Comment: A landmark study of transcatheter aortic valve implantation (TAVI) in high-risk patients. After showing the superiority of TAVI to best medical management, the following PARTNER trial randomized high-risk patients with severe aortic valve stenosis to TAVI or surgical aortic valve replacement. Despite important differences in procedural risk, TAVI was equivalent to surgical therapy.

3. Transcatheter aortic valve implantation in aortic stenosis: the role of echocardiography.
Jayasuriya C, Moss RR, Munt B.
J Am Soc Echocardiogr. 2011; 24(1): 15-27. Review. PubMed PMID: 21126855.

Comment: In this review the authors focus upon the role of echocardiography in transcatheter aortic valve implantation with comments on complementary imaging techniques.

4. Intracardiac echocardiography: a new guiding tool for transcatheter aortic valve replacement.
Bartel T, Bonaros N, Müller L, Friedrich G, Grimm M, Velik-Salchner C, Feuchtner G, Pedross F, Müller S.
J Am Soc Echocardiogr. 2011; 24(9): 966-75. PubMed PMID: 21641183.

Comment: The new echotechnique IntraCardiac Echocardiography (ICE) can be performed with sedation and local anaesthesia and is an alternative for TOE during TAVI. Compared with ICE, TOE underestimated intra-procedural pressure gradients in comparison with pre-interventional measurements.

5. Acute left ventricle diastolic function improvement after transcatheter aortic valve implantation.
Gonçalves A, Marcos-Alberca P, Almeria C, Feltes G, Rodríguez E, Hernández-Antolín RA, Garcia E, Maroto L, Fernandez Perez C, Silva Cardoso JC, Macaya C, Zamorano JL.
Eur J Echocardiogr. 2011; 12(10): 790-7. PubMed PMID: 21865229.

Comments: The first study describing improvement in LV diastolic performance with transmitral velocity patterns and LV end-diastolic pressure measurements before and immediately after TAVI.

6. Acute regional improvement of myocardial function after interventional transfemoral aortic valve replacement in aortic stenosis: A speckle tracking echocardiography study.
Schattke S, Baldenhofer G, Prauka I, Zhang K, Laule M, Stangl V, Sanad W, Spethmann S, Borges AC, Baumann G, Stangl K, Knebel F.
Cardiovasc Ultrasound. 2012; 10(1): 15. PubMed PMID: 22448716.

7. Early and late improvement of global and regional left ventricular function after transcatheter aortic valve implantation in patients with severe aortic stenosis: an echocardiographic study.
Giannini C, Petronio AS, Talini E, De Carlo M, Guarracino F, Grazia M, Donne D, Nardi C, Conte L, Barletta V, Marzilli M, Di Bello V.
Am J Cardiovasc Dis. 2011; 1(3): 264-73. PubMed PMID: 22254204.

Comment: These two studies showed an acute improvement of myocardial longitudinal systolic function measured by 2D strain analysis immediately after TAVI. The radial, circumferential strain and LVEF do not change significantly acutely after TAVI. Only after 3 months, LV end-systolic volume and LV mass were significantly reduced, and a small improvement of LVEF was observed.

8. Left and right ventricular function in aortic stenosis patients 8 weeks post-transcatheter aortic valve implantation or surgical aortic valve replacement.
Forsberg LM, Tamás E, Vánky F, Nielsen NE, Engvall J, Nylander E.
Eur J Echocardiogr. 2011; 12(8): 603-11. PubMed PMID: 21705353.

Comment: Right ventricular dysfunction may complicate surgical aortic valve surgery. In this study, peak systolic velocity of the right ventricle (RV) increased in TAVI patients, while the atrioventricular plane displacement (AVPD) remained unchanged. In the matched surgical patients, it was concluded that the decreased peak systolic velocities and decreased AVPD at the 8-week follow-up represented impaired RV systolic function.

9. Comparison between transcatheter and surgical prosthetic valve implantation in patients with severe aortic stenosis and reduced left ventricular ejection fraction.
Clavel MA, Webb JG, Rodés-Cabau J, Masson JB, Dumont E, De Larochellière R, Doyle D, Bergeron S, Baumgartner H, Burwash IG, Dumesnil JG, Mundigler G, Moss R, Kempny A, Bagur R, Bergler-Klein J, Gurvitch R, Mathieu P, Pibarot P.
Circulation. 2010; 122(19): 1928-36. PubMed PMID: 20975002.

Comment: The objective of this study was to compare TAVI and surgical aortic valve replacement (SAVR) with respect to postoperative recovery of LVEF in patients with severe aortic stenosis and reduced LV systolic function (mean LVEF in both groups was 34%). TAVI patients had better recovery of LVEF compared with SAVR patients (ΔLVEF, 14±15% versus 7±11%; P=0.005). At the 1-year follow-up, 58% of TAVI patients had a normalization of LVEF (>50%) as opposed to 20% in the SAVR group.

10. Percutaneous repair or surgery for mitral regurgitation.
Feldman T, Foster E, Glower DD, Kar S, Rinaldi MJ, Fail PS, Smalling RW, Siegel R, Rose GA, Engeron E, Loghin C, Trento A, Skipper ER, Fudge T, Letsou GV, Massaro JM, Mauri L; EVEREST II Investigators.
N Engl J Med. 2011; 364(15): 1395-406. PMID:21463154

Comment: In this landmark study patients with severe (grade 3+ or 4+) mitral regurgitation were randomly assigned in a 2:1 ratio to undergo either percutaneous repair or conventional surgery for repair or replacement of the mitral valve. The primary composite end point for efficacy was freedom from death, from surgery for mitral-valve dysfunction, and from grade 3+ or 4+ mitral regurgitation at 12 months. Although percutaneous repair was less effective at reducing mitral regurgitation than conventional surgery (55% vs. 73%), the procedure was associated with superior safety and similar improvements in clinical outcomes.