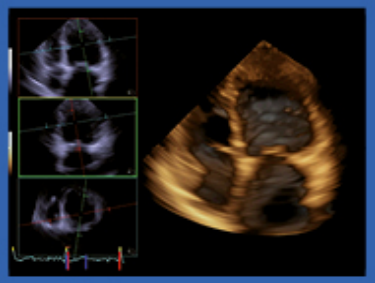


EuroValve

March 27 - 28, 2015

A case of prosthetic endocarditis

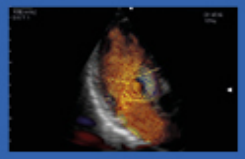
Eric Brochet, Claire Cimadevilla, Laurent Lepage, Francois Rouzet, Phalla Ou, Xavier Duval, Patrick Nataf, Ulrik Hvass,David Messika Zeitoun, Bernard Iung

Bichat Hospital

Diderot University DHU FIRE

Paris, France



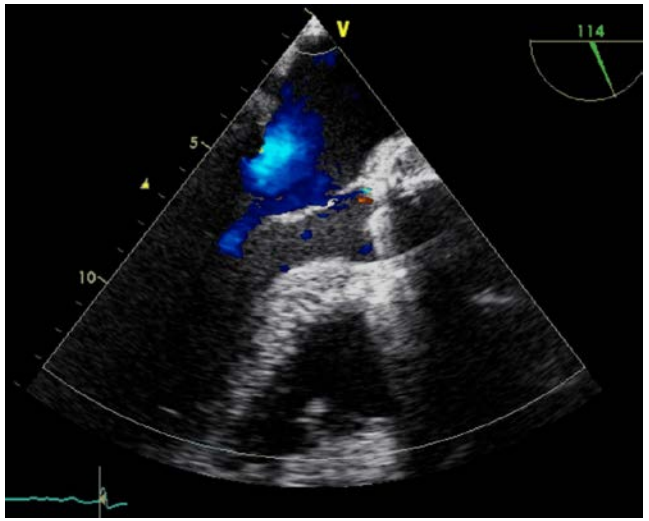



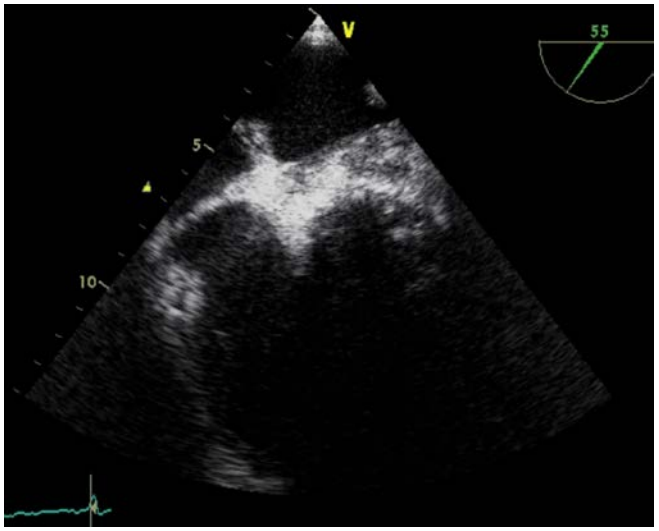
MR L, 60 yo

- 4 March 2014 :
- Aortic root replacement with aortic mechanical valve (Bentall procedure) in treatment of annulo aortic ectasia with aortic regurgitation

Case

- Uncomplicated post operative course
- TTE/TEE before discharge
  - well functioning mechanical prosthetic valve . No AR
  - well-seated ascending root graft
  - Non circulant peri tubular hematoma (10 mm)
- Discharge day 8





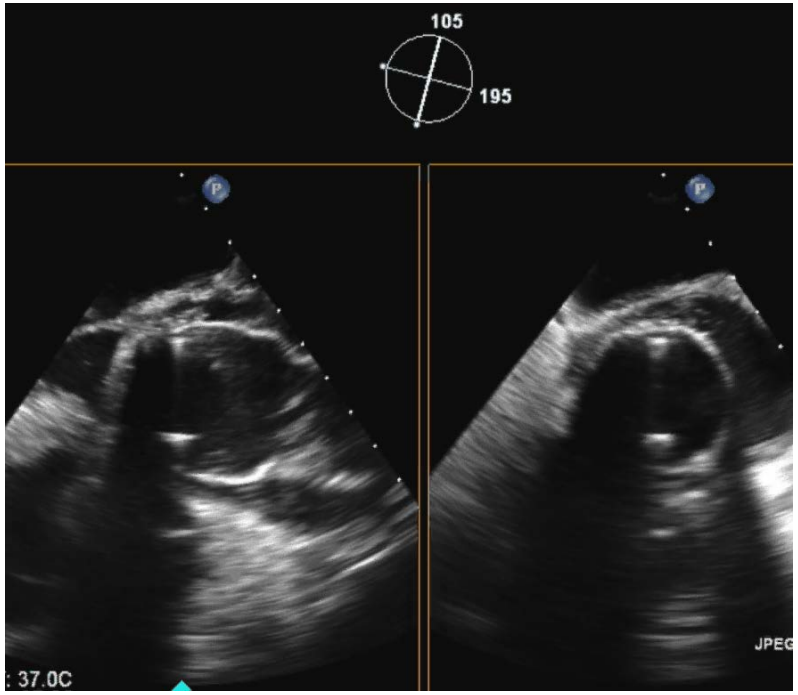
Case

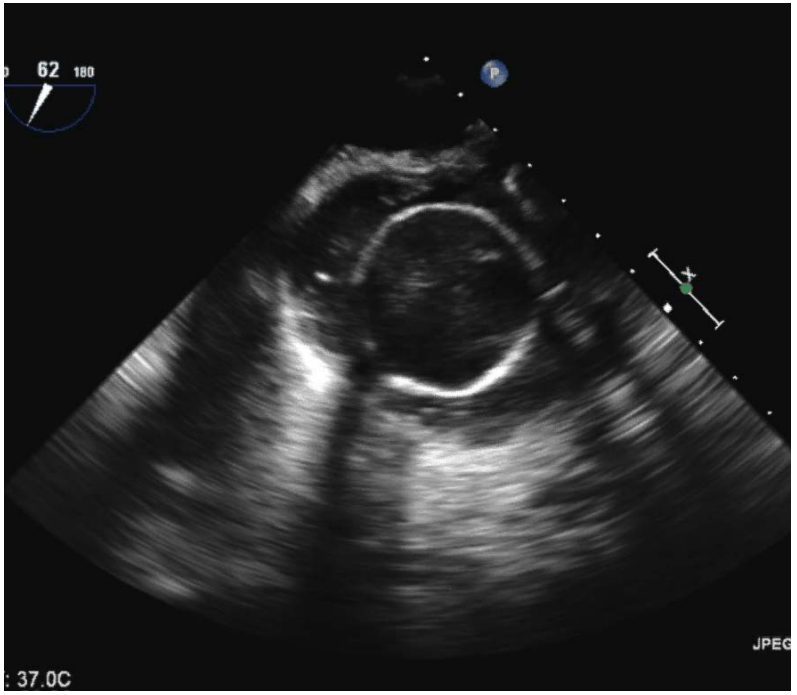
- **3 months later : May 2014**
  - **Bulging and erythema of the upper part of the sternotomy site**
  - **Discharge of pus. No culture performed**
  - **Diagnosis of superfical abcess , managed by incision and local care + oral antibiotics (amoxicillin/clavulanic acid)**
- **August and September 2014**
  - **Repeated episodes of inflammation of the sternotomy site**
  - **No fever**
  - **Spontaneous discharge of serous material. Culture negative**
  - **Treated by incision and local care + oral antibiotics**

Case

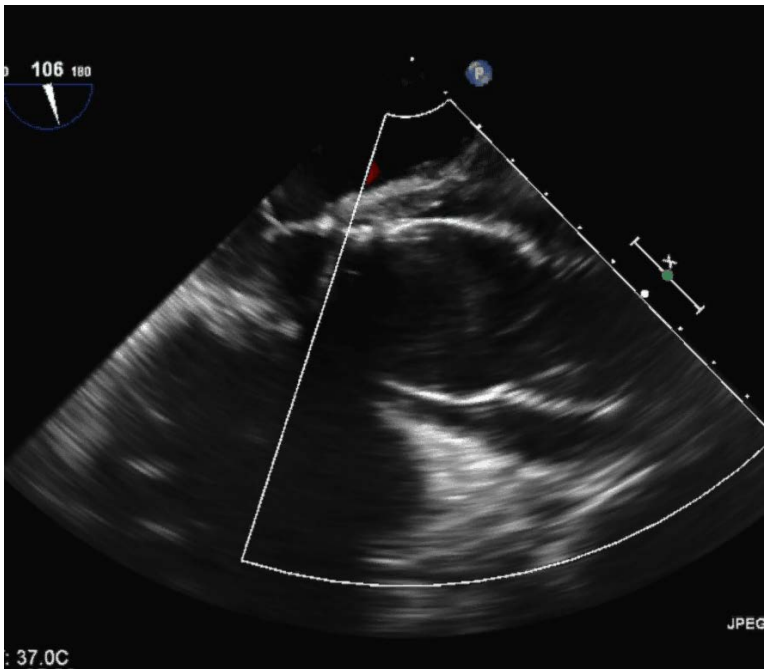
- **September 2014 (6 months post operative)**
- **Readmitted for assessment of superficial wound dehiscence with persistance of discharge of white serous material**
  - **No fever**
  - **Solid sternal edge and non inflammatory sternotomy wound**
  - **No clinical sign of prosthesis dysfunction**
  - **Biology : CRP 7 mg/l, leukocytosis 4800/ml**
  - **Negative culture of material ,negative blood cultures**
  - **TTE/TEE**

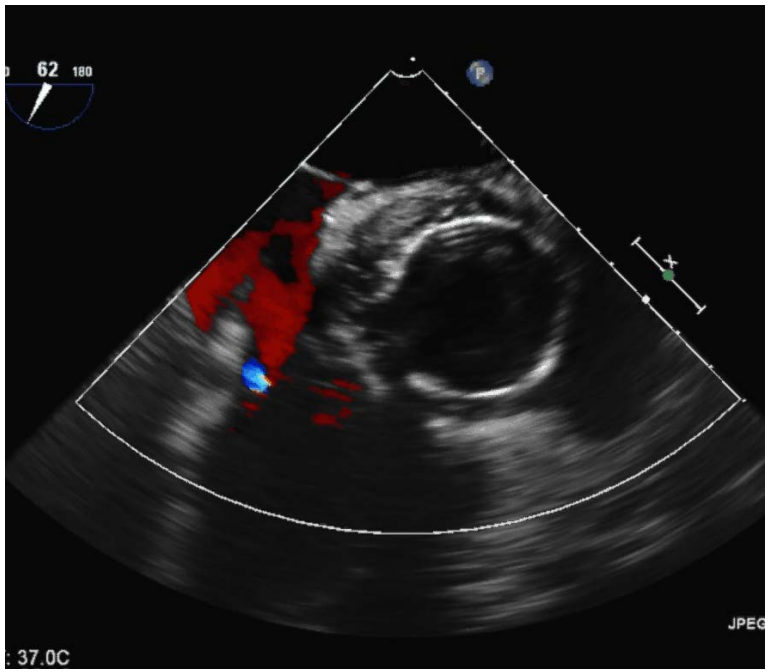
TEE





TEE





Enhanced CT

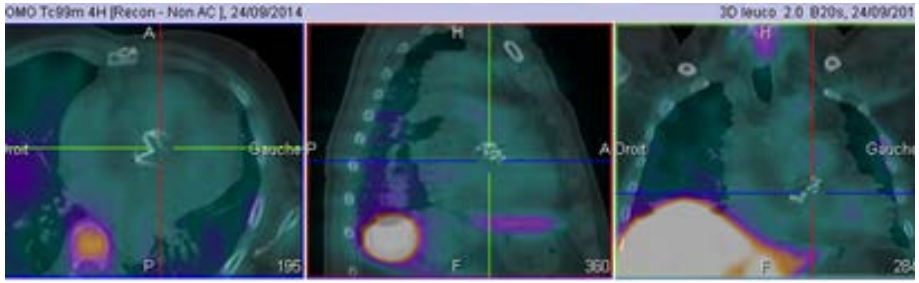
Periprostetic collection (28 mm max) consistent with hematoma

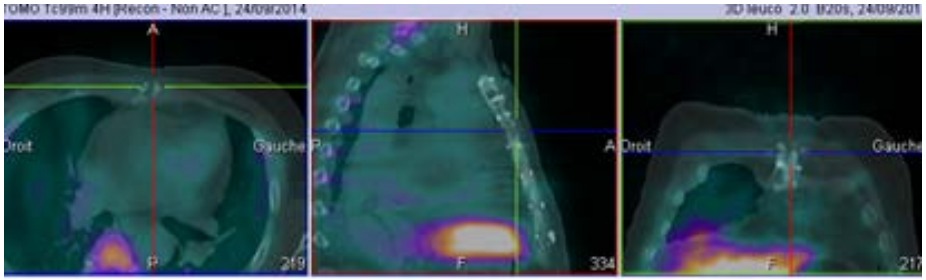
99mTc-HMPAO labelled WBC Scintigraphy

Aortic valve

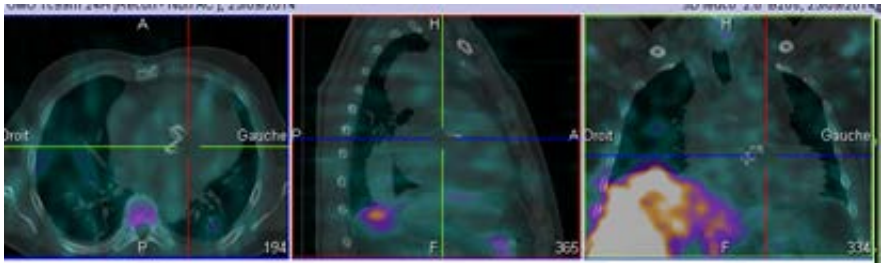
Sternum

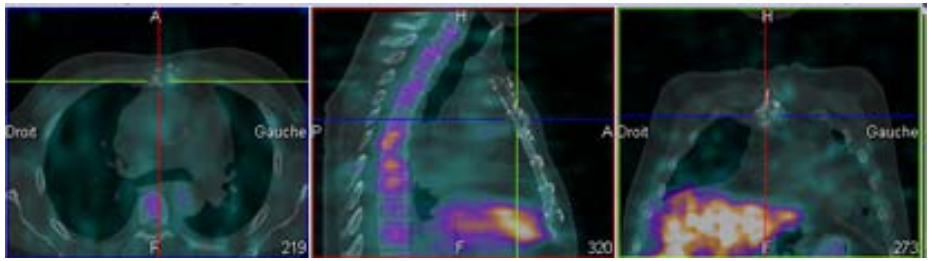
SPECT acquisition: 4 hours post-reinjection





SPECT acquisition: 24 hours post-reinjection





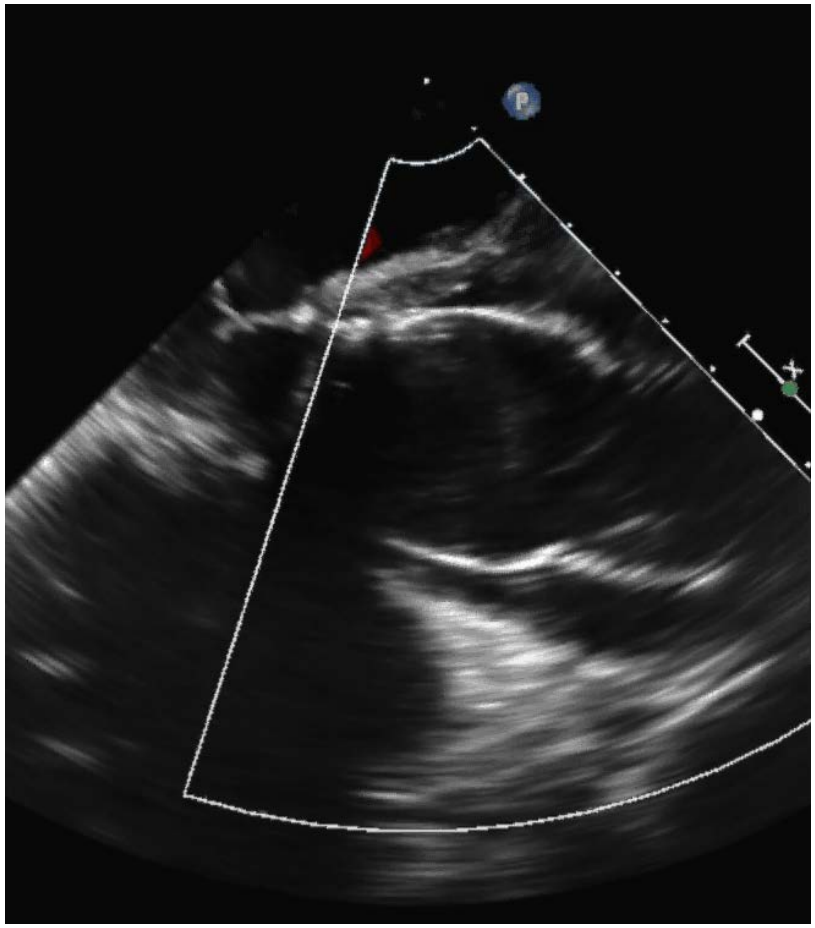
Case

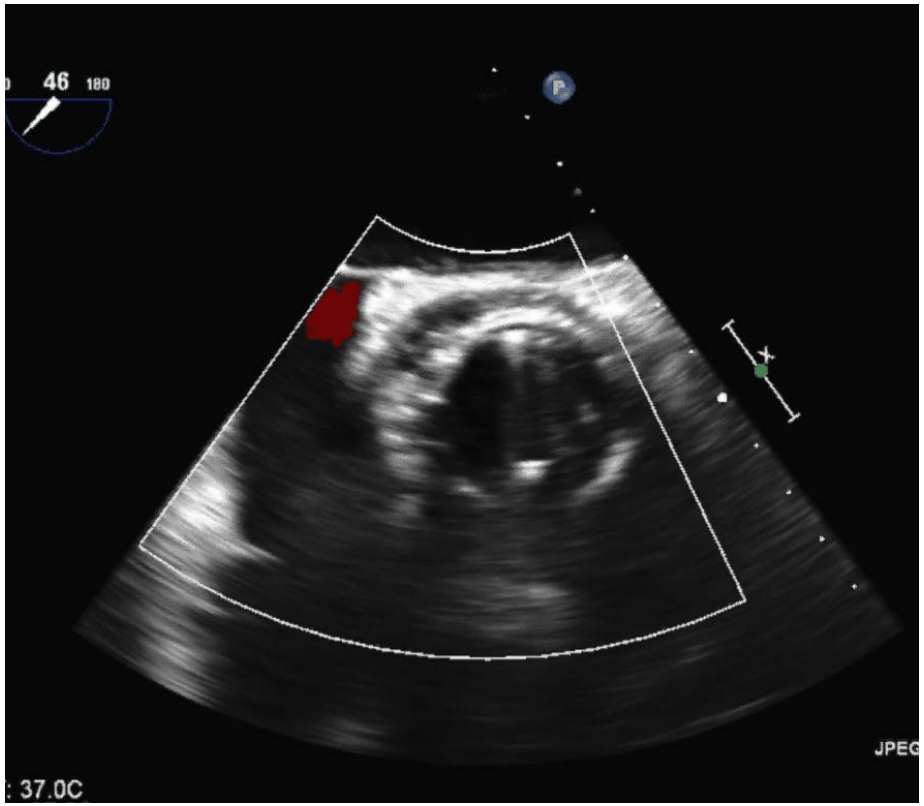
- No evidence of infection
- Therapeutic decision :
  - Removal of upper sternal sutures and surgical wound debridement
  - Culture negative
  - No antibiotic treatment
  - Scheduled for FU reassessment one month later

Case

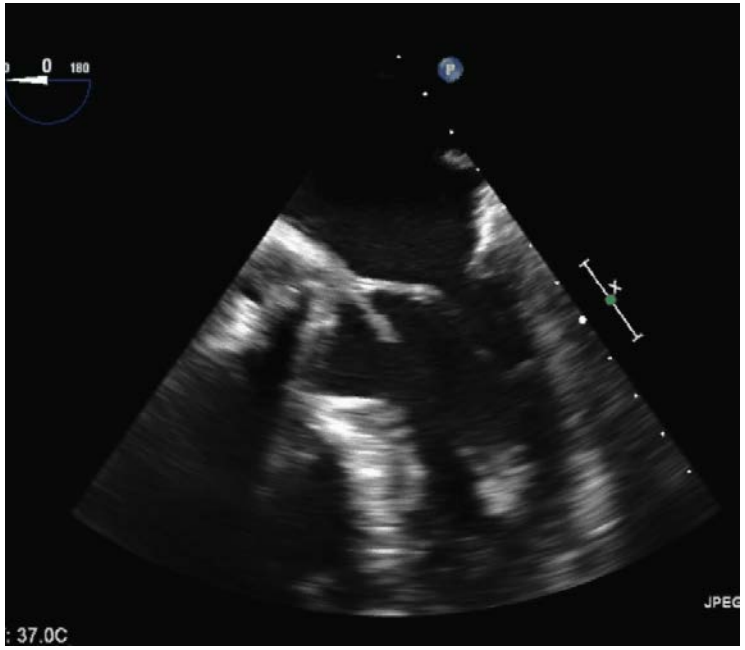
- **December 2014 : routine FU assessment**
  - **No fever**
  - **Sternotomy site : complete wound healing ,no inflammation, no discharge**
  - **No clinical evidence of prosthetic dysfunction**
  - **Biiology : CRP 12 mg/l, leukocytosis 7600/ml**
  - **Blood cultures : negative**
  - **EKG: sinus rythm. No conduction abnormality**

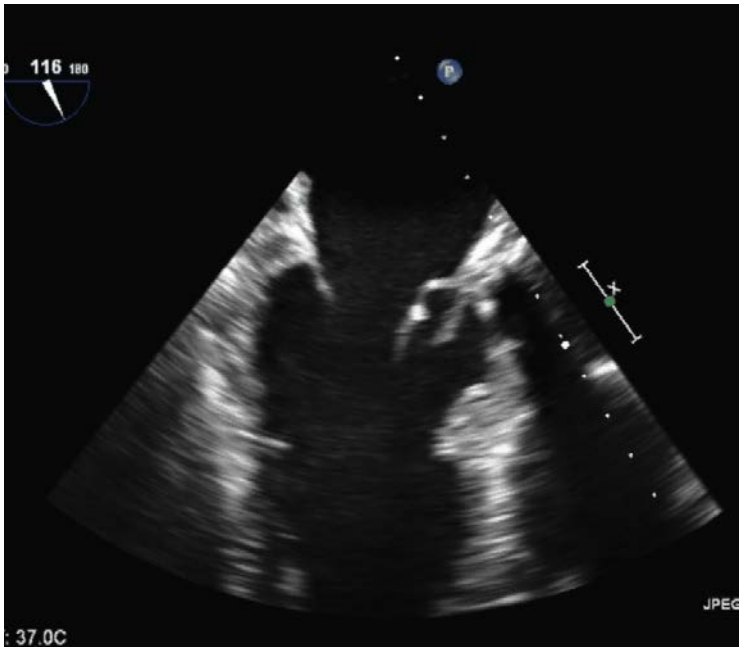
TEE





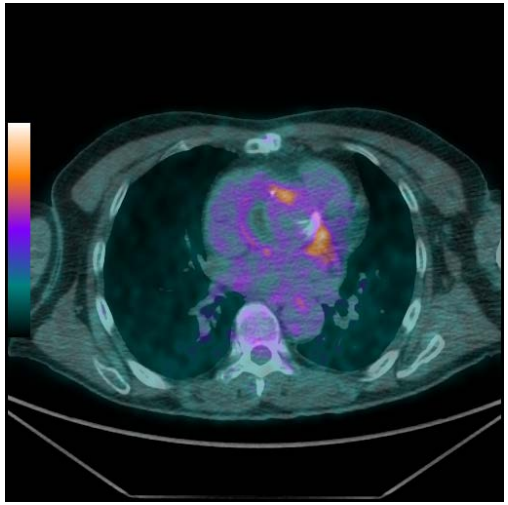
TEE

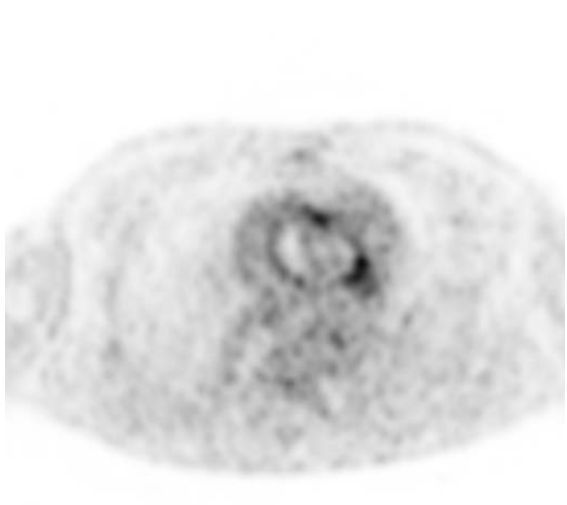


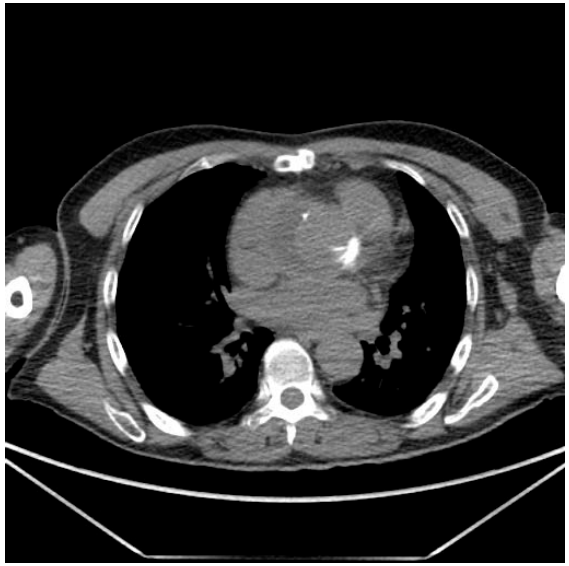


^{18}F-FDG-PET/CT

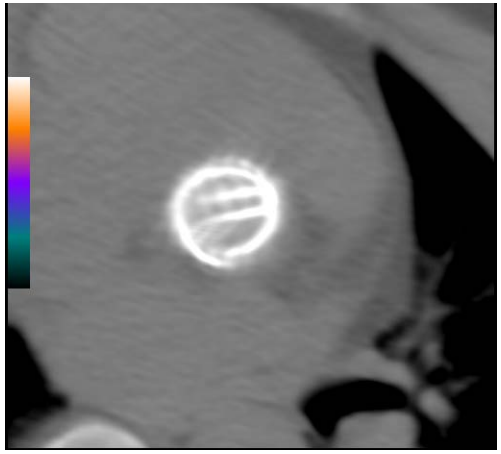
Axial slices

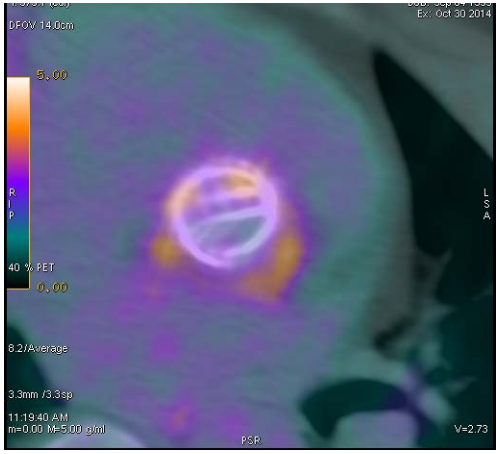


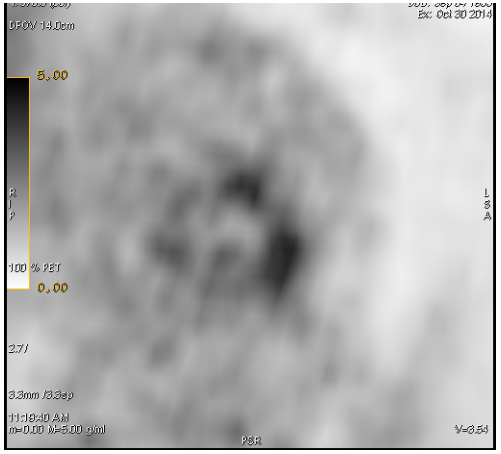




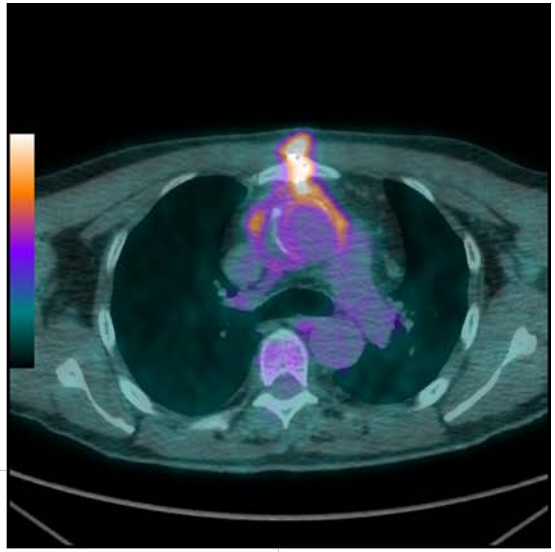
Oblique reformatting

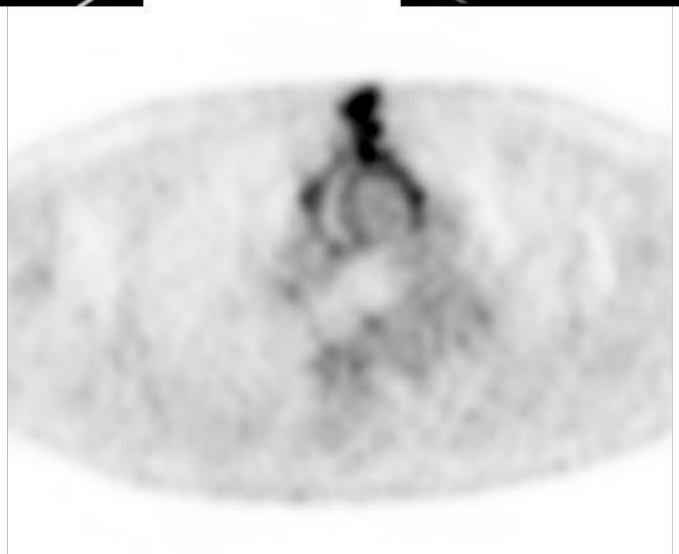






^{18}F-FDG-PET/CT





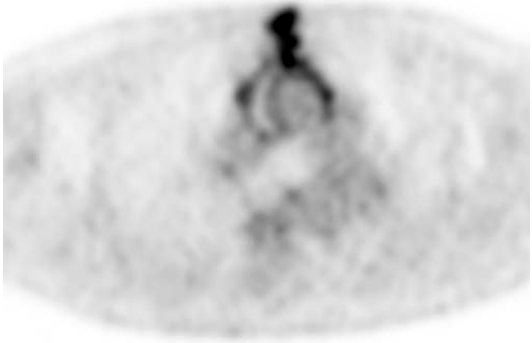
Case

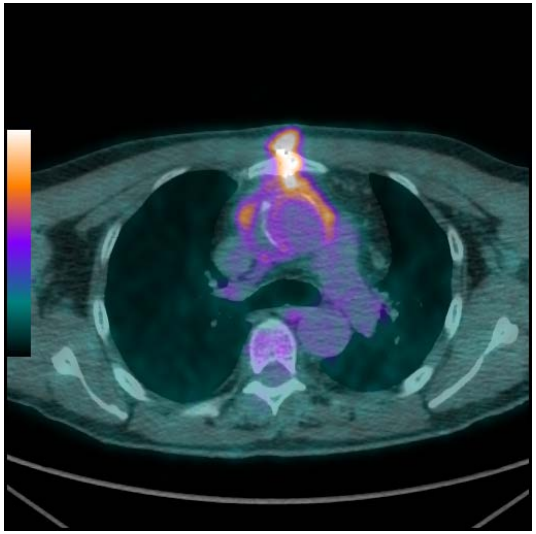
- Multidisciplinary decision : repeat surgery
- Ascending aortic and aortic valve replacement with homograft (7/11/2014)
- Positive culture of the periprosthetic material: staphylococcus aureus meti S + staphyloccoccus epidermidis
- 6 weeks antibiotic therapy
  - Vancomycin/Gentamicin/Doxycyclin
  - Levofloxacine Rifampicine amoxycillin

Case

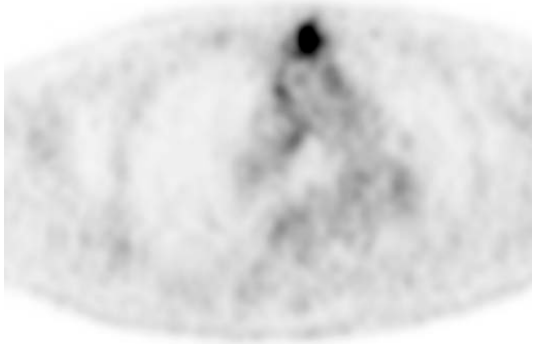
- **Follow up December 2014**
  - **No obvious abnormality suggesting endocarditis**
  - **control TEE/ PET-CT/**
  - **Favourable course at 6 months**

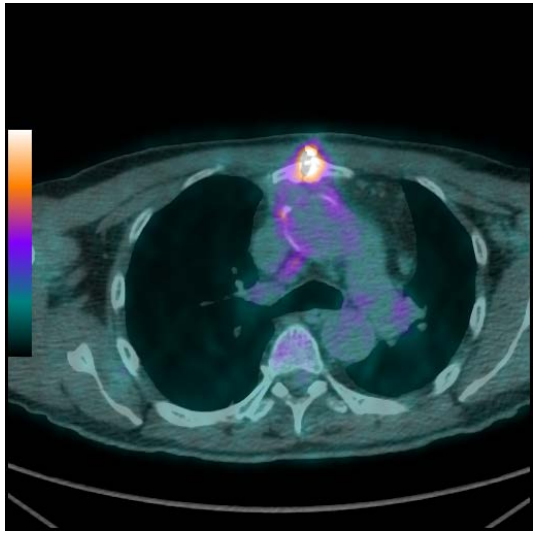
BEFORE SURGERY





1 month AFTER SURGERY





Discussion

- **Thoracic aortic prosthetic graft infection**
  - **High morbidity and mortality**
    - **high risk of repeat surgery**
    - **early and precise diagnosis is essential to improve surgical outcomes**
  - **Difficult diagnosis**
    - **non-specific clinical presentation**
    - **most of the cases, conventional imaging non specific**
    - **TEE/CT : difficult to differentiate hematoma from infection**
    - **Adding value of FDG-PET/CT, Leukocyte scintigraphy,…?**

Positron Emission Tomography/Computed Tomography for Diagnosis of Prosthetic Valve Endocarditis

Increased Valvular ^{18}F-Fluorodeoxyglucose Uptake as a Novel Major Criterion

Ludivine Saby, MD,* Olivia Laas, MD,† Gilbert Habib, MD,* Serge Cammilleri, MD, PhD,† Julien Mancini, MD, PhD,‡ Laetitia Tessonnier, MD,† Jean-Paul Casalta, MD,§ Frederique Gouriet, MD, PhD,§ Alberto Riberi, MD,‖ Jean-Francois Avierinos, MD,* Frederic Collart, MD,‖ Olivier Mundler, MD, PhD,† Didier Raoult, MD, PhD,§ Franck Thuny, MD, PhD*§¶

Marseille, France

- **Sensitivity and specificity of FDG PET/CT 73% and 80%, respectively**
- **When results of PET/CT are combined with other clinical, microbiological, and echocardiographic parameters, the sensitivity of the modified Duke criteria dramatically increased to 97%**

Table 5 Diagnostic Value of the Modified Duke Criteria at Admission With (Duke-PET/CT) and Without the Implementation of the PET/CT Results

	Final Diagnosis		
	Definite PVE	*Possible* PVE	*Rejected* PVE
Duke			
Definite PVE	21 (70)	0 (0)	0 (0)
Possible PVE	8 (27)	22 (100)	10 (50)
Rejected PVE	1 (3)	0 (0)	10 (50)
Duke-PET/CT			
Definite PVE	29 (97)	10 (45)	2 (10)
Possible PVE	1 (3)	12 (55)	10 (50)
Rejected PVE	0	0	8 (40)

Saby L et al J Am Coll Cardiol 2013;61:2374–82

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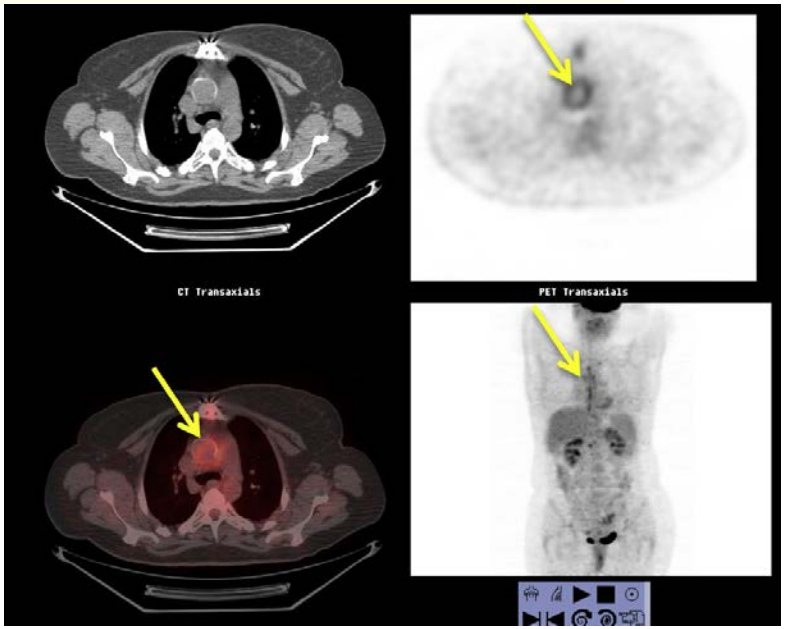
Marseille, France

- **False-positive PET/CT results**
- **Abnormal uptake of FDG at the level of aortic root graft and next to a mechanical aortic prosthetic valve (Bentall procedure)**



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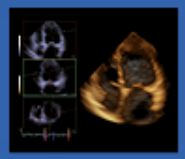


EuroValve

Respective Performance of ^{18}F-FDG PET and Radiolabeled Leukocyte Scintigraphy for the Diagnosis of Prosthetic Valve Endocarditis

François Rouzet[1,2], Renata Chequer[1], Khadija Benali[1,2], Laurent Lepage[3], Walid Ghodbane[3], Xavier Duval[4], Bernard Iung[2–5], Alec Vahanian[2–5], Dominique Le Guludec[1,2], and Fabien Hyafil[1,2]

- **High sensitivity of 18F-FDG PET for the detection of active infection in patients with suspected PVE and inconclusive echocardiography findings**
- **However FDG uptake can be observed in non infected graft, especially in the first 2 mo after surgery**
- **Leukocyte scintigraphy offers higher specificity than 18F-FDG PET for the diagnosis of PVE, but lower sensitivity**
- **A sequential strategy consisting of performing 18F-FDG PET imaging initially and following it with leukocyte scintigraphy when the former is inconclusive or when patients had positive 18F-FDG PET results in the first 2 mo after cardiac surgery strongly improved the diagnosis of PVE**

Rouzet F et al J Nucl Med 2014; 55:1980–1985

EuroValve

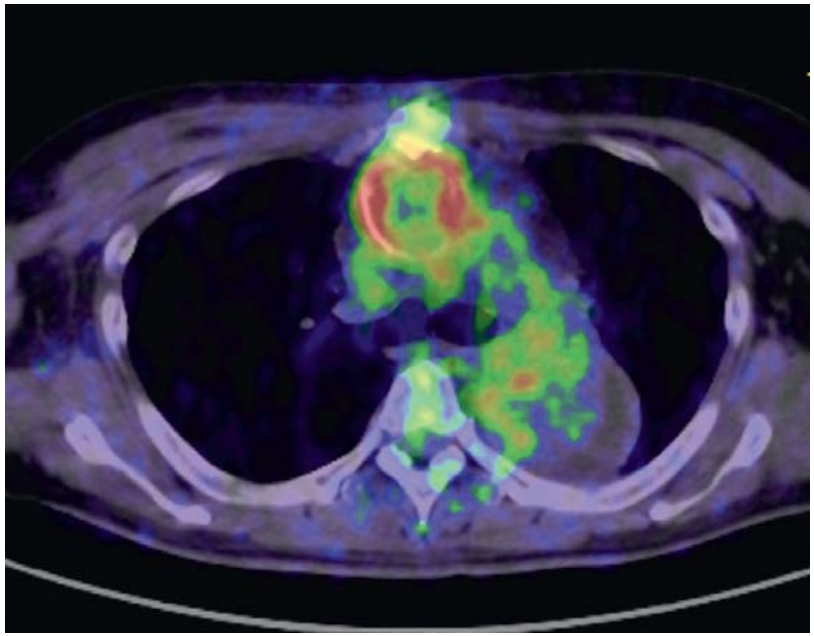
European Journal of Cardio-Thoracic Surgery 43 (2013) 1183–1187
doi:10.1093/ejcts/ezs693 Advance Access publication 18 January 2013

ORIGINAL ARTICLE

Detection of thoracic aortic prosthetic graft infection with ^{18}F-fluorodeoxyglucose positron emission tomography/computed tomography†

Yoshiyuki Tokuda[a,*], Hideki Oshima[a], Yoshimori Araki[a], Yuji Narita[a], Masato Mutsuga[a], Katsuhiko Kato[b] and Akihiko Usui[a]

- **Retrospective study. 9 patients**
- **FDG-PET/CT is useful for confirming the presence of graft infection by detecting high uptake around grafts and excluding other causes of inflammation.**
- **An SUV max value greater than 8 around a graft suggests the presence of graft infection.**



Yokude at al European Journal of Cardio-Thoracic Surgery 43 (2013) 1183–1187

Which imaging technique ?

	ADVANTAGES	LIMITATIONS
TEE	Identification of vegetation, prosthesis dysfunction, fistula..	Non specific findings (hematoma vs infection)
CT	Anatomic lesions	Non specific of infection
FDG-PET/CT	High sensitivity for the detection of active infection (heterogeneity of uptake +++)	18 FDG uptake in most vascular prostheses in the immediate postoperative period (false +)
Leukocyte scintigraphy	High specificity for the detection of active infection	False negative in vegetations or drained abscesses

Conclusion

- **Prosthetic aortic graft infections represent a major diagnostic and therapeutic challenge**
- **Combination of clinical assessment, imaging and microbiological investigations is usually helpful, but no agreed criteria to confirm the diagnosis of infection**
- **Knowledge of advantages and limitations of imaging techniques**
- **Importance of serial examinations +++**
- **Importance of multi-disciplinary group to interpret imaging techniques and offer guidance of therapy**
- **Long follow-up of these patients needed**

Thank you