# XXI CARACT

## Congresso Anestesia e Rianimazione CardioToracoVascolare

**Bologna, 4-5 dicembre 2025**

# ABSTRACT BOOK

SIAARTI

PRO VITA CONTRA DOLOREM SEMPER

# INDICE ABSTRACT XXI CARACT

# A1

## CASE REPORT FROM A NEGLECTED WAR


### AUTHORS

*Flaminia Canichella [1, 2], Elisabetta Maio [2], Daniela Rocchi [2], Israa Abdalmajed [2], Abrar Hamouda [2], Aisha Mohamed Zahreldeen Shareef [2], Manahel Bader Saad [2], Mohannad Abbass [2], Elena Giovanella [2]*

*[1] National Institute for Infectious Diseases Lazzaro Spallanzani, Rome, Italy*
*[2] The Salam Centre for Cardiac Surgery, Emergency NGO, Khartoum, Sudan*


### BACKGROUND

Rheumatic heart disease is an endemic condition in sub-Saharan Africa, an indicator of poor socioeconomic conditions and an inadequate healthcare system[1].

Despite ongoing efforts to strengthen prophylaxis and early diagnosis, access to cardiac surgery remains essential yet rarely available.

Since 2007, EMERGENCY NGO has managed the Salam Centre for Cardiac Surgery in Khartoum, Sudan, a centre of excellence providing free, high-quality care to patients requiring open-heart surgery for advanced rheumatic and congenital heart diseases. Since its opening, more than 10,000 patients have undergone surgery, most of them Sudanese, with about 20% coming from other countries, a model of inter-African cooperation[2]. Since 15 April 2023, Sudan has been the scene of a civil war between the Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF), leading to one of the world's most severe humanitarian crises[3], with over 12 million displaced people and 30.4 million in need of health assistance[4]. Despite the collapse of the national healthcare system, with one in three hospital no longer operational and severe restrictions on humanitarian workers' mobility[5], the Salam Centre has remained fully functional, ensuring continuity of care and life-saving interventions for the Sudanese population.

We present the case of a patient with advanced rheumatic heart disease, whose postoperative course was complicated by severe left ventricular failure, septic shock, and prolonged intensive care unit stay. The case highlights how the ongoing conflict in Sudan affects patients' conditions at presentation, resulting in a long and complex postoperative course that requires advanced resources and multidisciplinary intensive management. In this context, the Salam Centre, the only operational cardiac surgery hospital in Khartoum and free of charge throughout Sudan, represents for many the only concrete opportunity to receive specialized care.

### CASE PRESENTATION

The patient is a 15-year-old boy, weighing 25 kg (BMI 11.5), from West Darfur, who arrived at the Salam Centre after 15 days of travel, in NYHA class IV. Chest X-ray shows a severely enlarged cardiac silhouette (Fig. 1). Echocardiography reveals: a severely dilated left ventricle with global systolic function at the lower limits, a moderately dilated right ventricle for body surface area, a dilated left atrium, severe mitral regurgitation with a posterior eccentric jet, moderate to severe aortic regurgitation, moderate tricuspid regurgitation with severe pulmonary hypertension, and estimated pulmonary artery pressure (sPAP) of 80 mmHg (Fig. 2, Fig. 3, Fig. 4).

The patient underwent combined mitral and aortic valve replacement. Intraoperatively, pericardial thickening and adhesions from previous episodes of pericarditis were observed.

After 166 minutes of cardiopulmonary bypass (CPB) and 109 minutes of aortic cross-clamping, cardiac rhythm was unstable with recurrent episodes of ventricular tachycardia, treated both electrically and pharmacologically. Transesophageal echocardiography (TEE) showed severely depressed left ventricular systolic function (EF 10–15%). Due to intraoperative hemodynamic instability and the risk of bleeding

related to pericardial adhesions, the patient was transferred to the intensive care unit (ICU) with open chest, intubated, sedated and on high inotropic support.

Two days later, the chest was closed, and serial echocardiographic evaluations showed a slight improvement of systolic function (EF 25%). An attempt to wean from mechanical ventilation failed, also due to the patient's severe malnutrition, and a tracheostomy was therefore performed on the 11th postoperative day.

During the ICU stay, the patient developed septic shock, initially treated with empirical antibiotic therapy, later adjusted according to culture results, which identified Serratia marcescens and Enterobacter cloacae in the blood and Pseudomonas aeruginosa in tracheal aspirate. Total parenteral nutrition with high caloric and lipidic support was also started.

Over the following days, the patient showed clinical improvement with response to antibiotic therapy, increased systolic function (EF 45%), and progressive weaning from mechanical ventilation, alternating spontaneous breathing with physiotherapy support.

The tracheostomy cannula was removed after six days, and the patient was discharged from the ICU after 19 days. The patient was discharged from the hospital after 27 days. A chest X-ray one month after admission showed a significantly reduced cardiac silhouette (Fig. 5), confirmed by an echocardiogram performed two months after surgery, which demonstrated markedly reduced ventricular dimensions and an EF of 60% (Fig. 6).

## DISCUSSION

This case illustrates the complex challenges in managing advanced rheumatic heart disease in a war-torn setting with limited resources. The patient, coming from a region still affected by conflict, arrived after a long journey under extreme conditions. This resulted in a prolonged postoperative hospital stay, complicated by severe left ventricular dysfunction and septic shock, which required prolonged intensive support and multidisciplinary management.

The case also highlights the impact of the ongoing conflict on public health in Sudan, where an already fragile healthcare system has been severely affected, with many hospitals closed or non-operational[5]. The violation of humanitarian corridors has compromised the safety of civilians and aid workers, limiting access to care and the supply of essential resources to healthcare facilities[6].

## CONCLUSION

The case highlights how chronic rheumatic heart disease can be successfully treated even in wartime settings thanks to specialized centers such as the Salam Centre, a model of healthcare resilience and effective multidisciplinary management. At the same time, it underlines how the armed conflict in Sudan has severe implications for public health, leading to delays in diagnosis and treatment, malnutrition, and the progression of rheumatic heart disease to advanced stages of heart failure.

## CONSENT

The use of personal data for the publication of clinical information and any related images has been authorized by the patients or by their parents in the case of minors.

**BIBLIOGRAPHY**


1. Aliyu IA, Bala JA, Yusuf I, Amole TG, Musa BM, Yahaya G, et al. Rheumatic Heart Disease Burden in Africa and the Need to Build Robust Infrastructure. JACC Adv. 2024 Dec;3(12):101347.
2. Miccio R, Quattrociocchi M, Valgoi L, Chatenoud L, Lentini S, Giovanella E, et al. Treating Children With Advanced Rheumatic Heart Disease in Sub-Saharan Africa: The NGO EMERGENCY's Project at the Salam Centre for Cardiac Surgery in Sudan. Front Pediatr. 2021 Aug 20;9:704729.
3. Wosornu E. Briefing to the Security Council on the humanitarian situation in Sudan, 20 March 2024. UN-Office for the Coordination of Humanitarian Affair.
4. OCHA. Sudan humanitarian needs and response plan executive summary [Internet]. Available from: https://reports.unocha.org/en/country/sudan
5. Musa MK, Eshun G, Modber MAA, Haruna UA, Abdulsalam A, Zailani AS, et al. Public health consequences of armed conflict in Sudan in the face of global donor fatigue. Public Health Chall. 2024 Mar;3(1):e156.
6. Aderinto N, Olatunji D. The consequences of Sudan's armed conflict on public health: a closer look at the devastating impact. Int J Surg Glob Health [Internet]. 2023 July [cited 2025 Oct 21];6(4). Available from: https://journals.lww.com/10.1097/GH9.0000000000000179


**FIGURES**

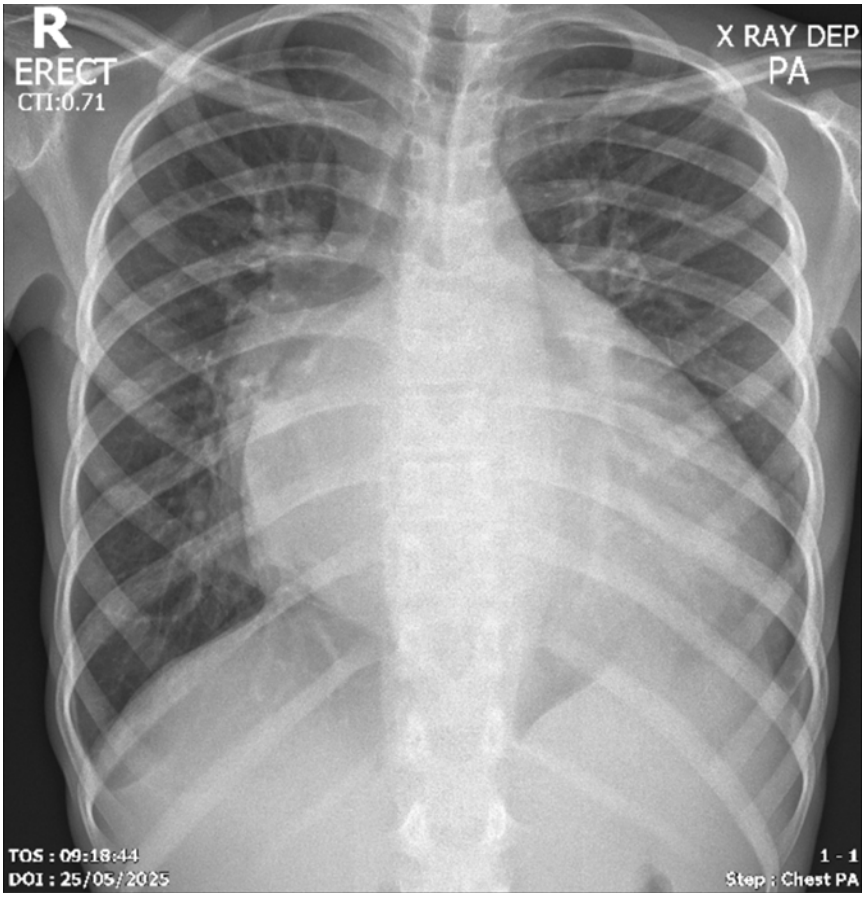


*Fig. 1: Chest X-Ray of admission*

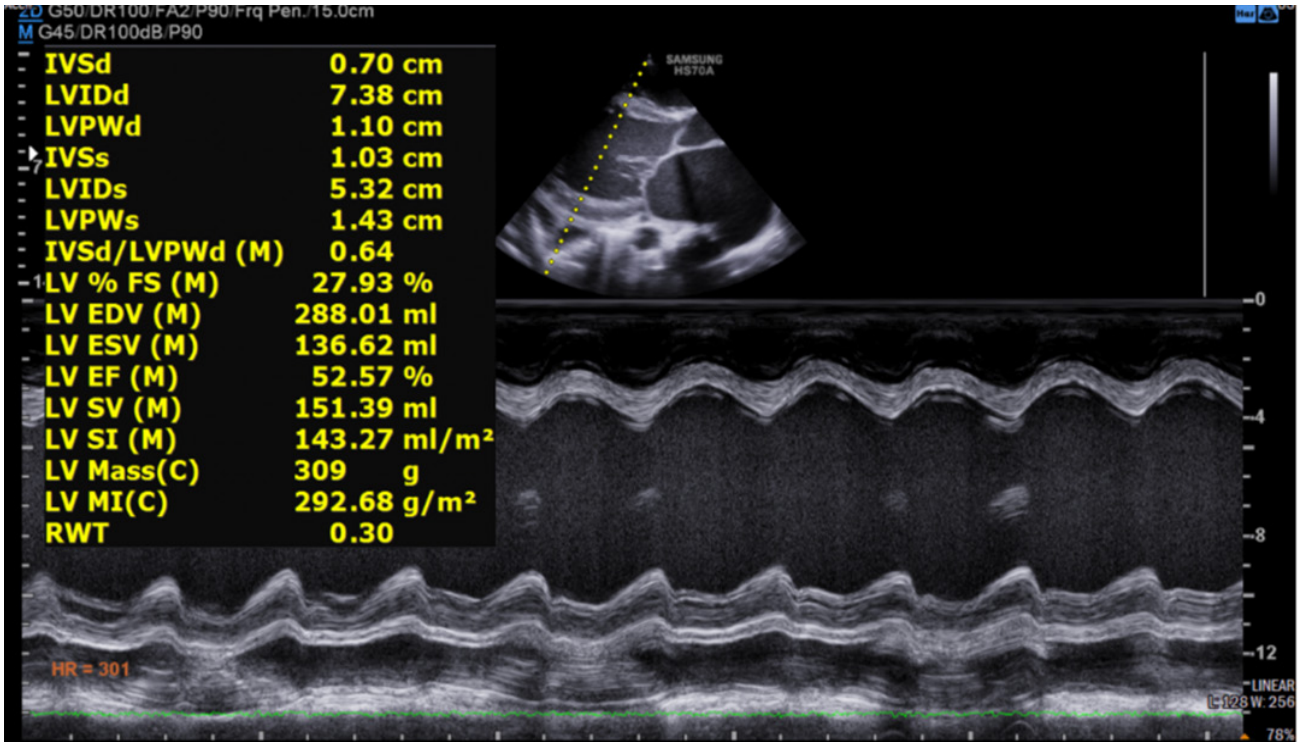


*Fig. 2: Parasternal long axis view: LV M-mode by Teicholz (TTE). Admission.*

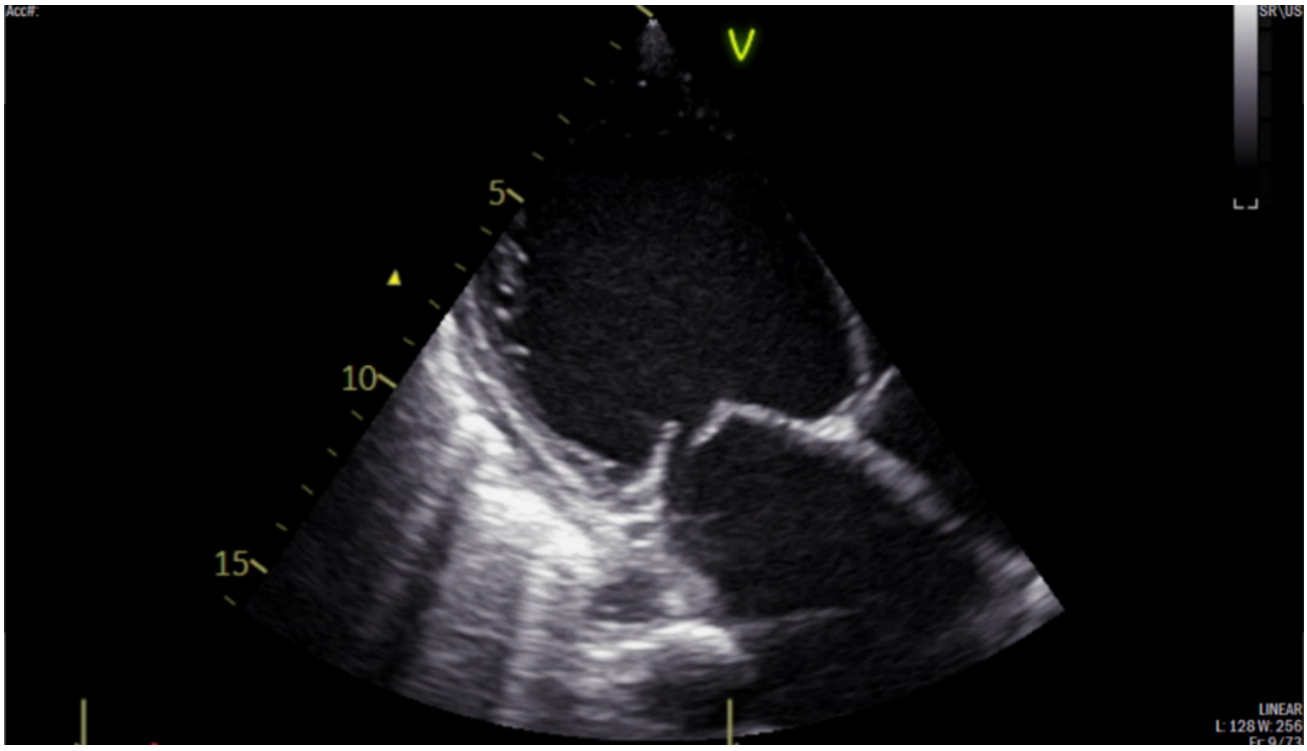


*Fig. 3: Apical 3 chambers view: mitral valve (TTE).*

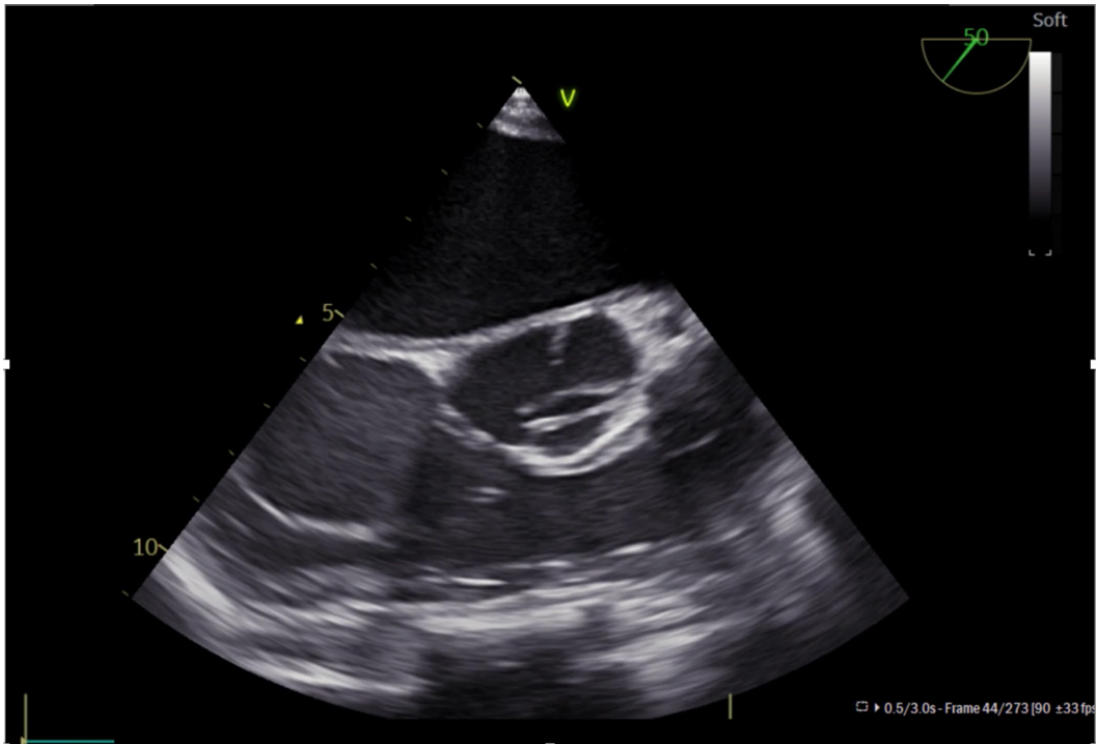


*Fig. 4: Mid-esophageal 50-degree view: aortic valve (TEE).*

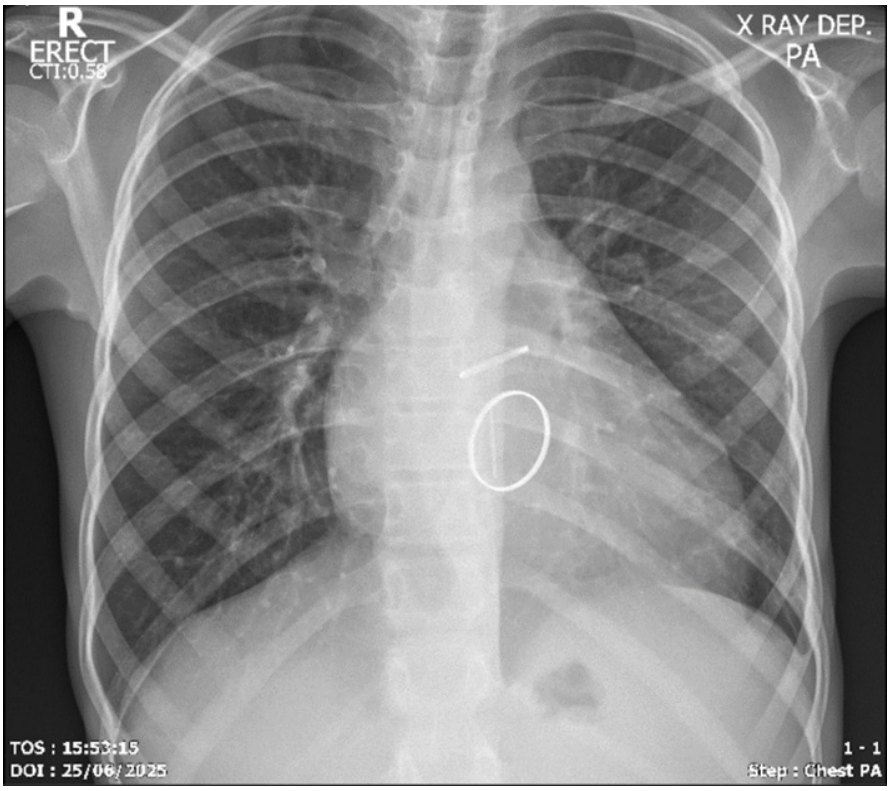


*Fig. 5: Chest X-Ray one month after the admission.*

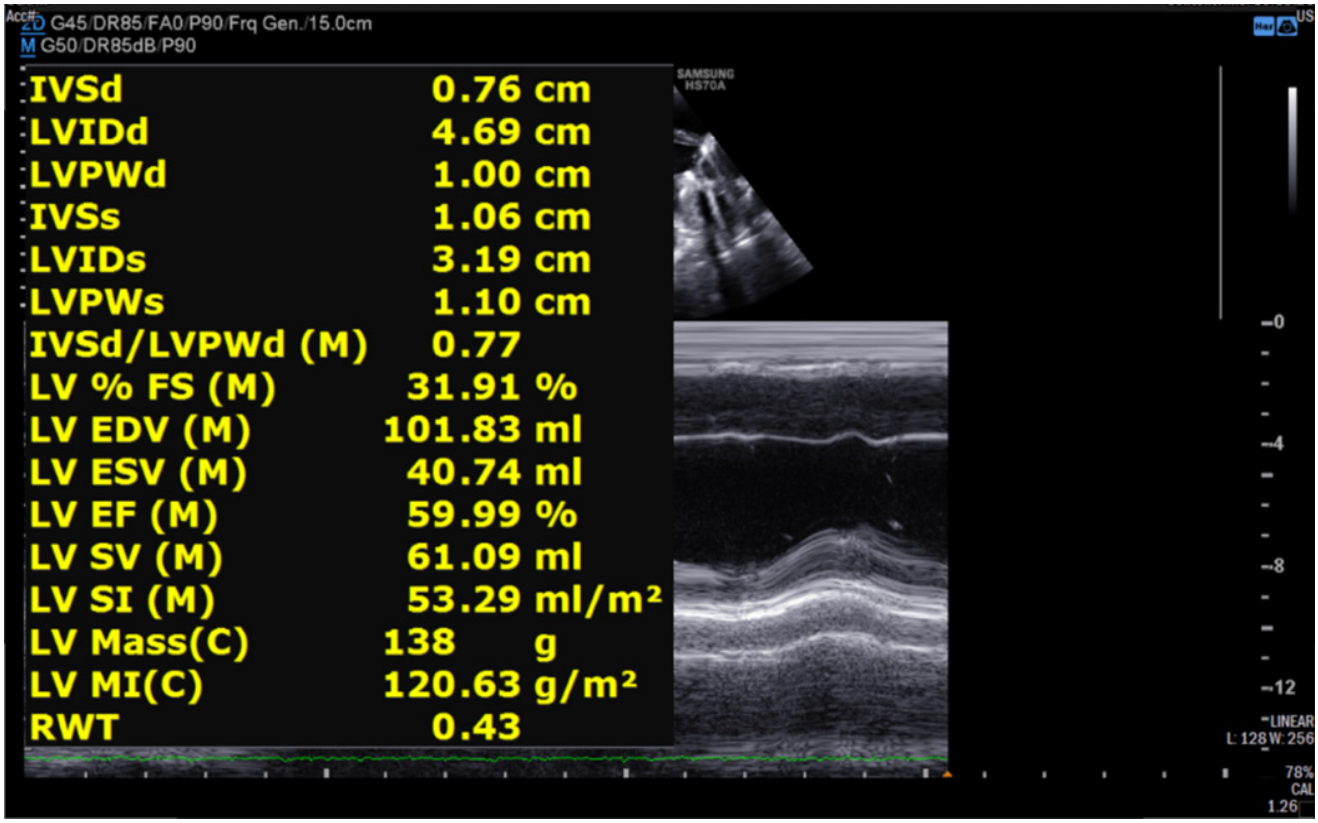


*Fig. 6: Parasternal long axis view: LV M-mode by Teicholz (TTE) two months after surgery.*

# A2

# EVALUATION OF THE ECHOGRAPHIC DP/DT AS A MARKER OF FLUID RESPONSIVENESS: A STUDY PROTOCOL

**AUTHORS**

*Silvia Finetto [1], Marco Tosi [1], Giovanni Paissan [1], Marco Pasetto [1], Marta Fasan [1], Lorenzo Peluso [1], Alessandro Russo [1], Leonardo Gottin [1]*

*[1] Cardiothoracic and Vascular Intensive Care Unit, Hospital and University Trust of Verona, P. le A. Stefani, 37124 Verona, Italy*

## INTRODUCTION

The assessment of fluid responsiveness is a key component in the hemodynamic management of critically ill patients, aimed at optimizing cardiac output while avoiding the risks associated with fluid overload or persistent hypoperfusion. Dynamic indices derived from heart–lung interactions, such as pulse pressure variation (PPV), stroke volume variation (SVV), have demonstrated superiority over static preload measures, although they still present methodological limitations. Echocardiography is a cornerstone of hemodynamic monitoring and enables non-invasive evaluation of the effects of applied therapies, as is fluid resuscitation; one such parameter is LVOT VTI variation, which, however, requires optimal imaging windows and Doppler alignment.

## OBJECTIVES

Echocardiographic dP/dT, obtained through continuous-wave (CW) Doppler assessment of the mitral regurgitation jet, provides a noninvasive estimation of left ventricular contractility during the isovolumetric contraction phase and is influenced by preload. We presume that the variation of dP/dT induced by a Tidal Volume Challenge (VtC) may potentially serve as a predictive test for fluid responsiveness, with potential technical advantages over LVOT VTI due to easier acoustic alignment both in transthoracic and transesophageal echocardiography. The primary objective is to determine the ΔdP/dT threshold capable of discriminating responders.

## METHODS

Prospective observational, cohort single-center study. Patient population: adult patients undergoing coronary artery bypass grafting. Exclusion criteria are LVEF<40%, presence of arrhytmias, severe aortic or mitral stenosis or regurgitation, fibrotic pulmonary disease.

During volume-controlled ventilation at 6 ml/kg of IBW, a VtC (increase to 8 ml/kg IBW for one minute) is performed. Echo dP/dT will be measured before the VtC (T1), at 30" (T2) and at the end of the VtC (T3) (Figure 1). A contestual increase in PPV ≥3.5% is used as the reference criterion to identify fluid responders.

## EXPECTED OUTCOME

Validate the ΔdP/dT as an easy, reliable and reproducible fluid responsiveness test.

**FIGURES**

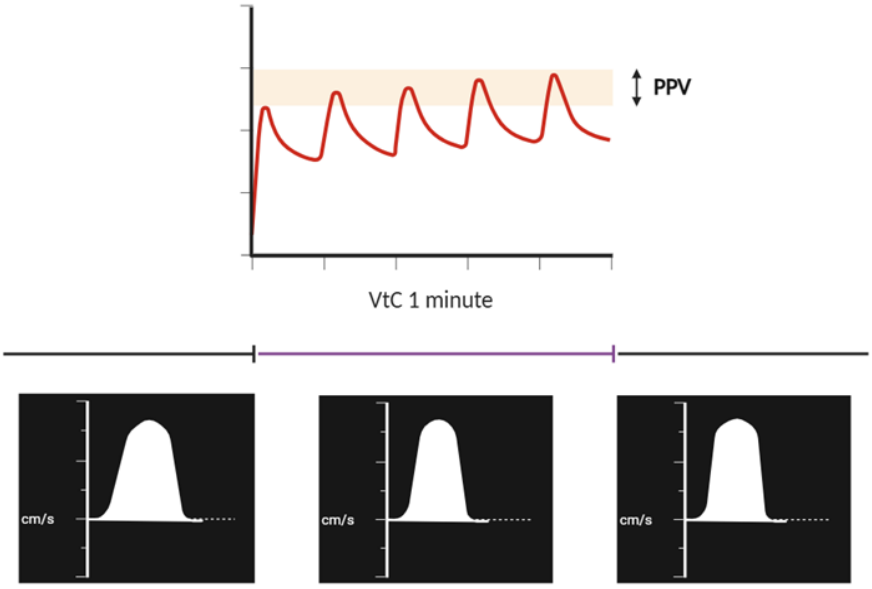


*Figure 1: schematic representation of the protocol.*

# A3

## KOUNIS SYNDROME FOLLOWING NEUROAXIAL ANESTHESIA IN A PATIENT WITHOUT KNOWN ALLERGIES: A CASE REPORT

**AUTHORS**

*Galasso Giovanni [1], Manzi Maurizio [1], Scarano Daniele [1], D'Orio Giuseppe [1], Persico Alfonso [1], Fortino Gerardo [1], Carbone Domenico [1]*

*[1] Anesthesia and Intensive Care Unit - Umberto I Hospital Nocera Inferiore (SA)*

**BACKGROUND**

Kounis syndrome (KS), also known as allergic acute coronary syndrome, is a rare but potentially fatal condition resulting from the concurrent occurrence of acute coronary events and hypersensitivity reactions. We present a case of KS occurring in a patient undergoing neuroaxial anesthesia, with no previous history of allergy.

**CASE PRESENTATION**

A previously healthy 50 years old male patient, without known allergies, underwent neuroaxial anesthesia for elective surgery at Umberto I Hospital in Nocera Inferiore (SA). Shortly after administration of pantoprazole and ceftriaxone (Rocephin), the patient developed sudden cardiovascular collapse with cardiac arrest. Return of spontaneous circulation (ROSC) was achieved after two defibrillation shocks. Coronary angiography revealed no significant stenosis or vasospasm. During the procedure, the patient experienced two additional cardiac arrests, both reversed after administration of intravenous adrenaline. Continuous infusions of adrenaline and noradrenaline were initiated, leading to hemodynamic stabilization. Electrocardiogram showed persistent ST-segment elevation in V1–V3, which normalized within 24 hours after gradual discontinuation of catecholamine support. Laboratory findings and clinical parameters returned to normal within 3 days, with a persistent mild increase in serum IgE levels.

**CONCLUSION**

This case highlights the importance of considering Kounis syndrome in the differential diagnosis of perioperative cardiac arrest, even in patients without a known allergic history. Prompt recognition and appropriate management with resuscitation, hemodynamic support, and discontinuation of triggering agents are crucial for patient survival and full recovery.

Patient gave informed consent to publication.

# A4

## CRIOANALGESIA PERIOPERATORIA IN CHIRURGIA DELLA PARETE TORACICA: ESPERIENZA PRELIMINARE DI UN SINGOLO CENTRO

**AUTORI**

*Anna Merlo, UOC anestesia e Rianimazione, Ospedale S.Bortolo Vicenza, AULSS 8 Berica*
*Cristina Pedroni, UOC anestesia e Rianimazione, Ospedale S.Bortolo Vicenza, AULSS 8 Berica*
*Marco Cosci, UOS Chirurgia Toracica, Ospedale S.Bortolo Vicenza, AULSS 8 Berica*
*Vinicio Danzi UOC anestesia e Rianimazione, Ospedale S.Bortolo Vicenza, AULSS 8 Berica*
*Salvatore Fabio Chiarenza, UOC Chirurgia Pediatrica, Ospedale S.Bortolo Vicenza, AULSS 8 Berica*

**SCOPO DELLO STUDIO**

La chirurgia della parete toracica si associa spesso ad un difficile controllo antalgico. La sindrome post-toracotomia è una seria complicanza caratterizzata da dolore toracico cronico ed invalidante con prevalenza in letteratura dal 33 al 91%.

La crionalgesia perioperatoria permette di interrompere temporaneamente la nocicezione di parete (degenerazione Walleriana), fino ad 8 settimane dopo la chirurgia.

Nel presente studio valutiamo l'iniziale esperienza presso il nostro centro in pazienti sottoposti ad interventi chirurgici sulla parete toracica trattati con crionalgesia perioperatoria.

**MATERIALI E METODI**

Dal 2023 al 2025 presso l'Ospedale San Bortolo di Vicenza abbiamo trattato con crionalgesia intercostale 4 pazienti. L'età media è 16,2 anni (range 14-19), tutti di sesso maschile. Le indicazioni alla crionalgesia sono state interventi per correzione di pectus excavatum (3 casi di procedura di Nuss, chirurgia pediatrica) e intervento per tumore osseo (1 caso di resezione costale e ricostruzione di parete, chirurgia toracica). I pazienti sono stati sottoposti a crionalgesia in sedazione profonda, almeno 24 ore prima dell'intervento chirurgico. I nervi intercostali interessati sono stati individuati ecograficamente e congelati a – 78°C (Fig.1) con criosonde dedicate (Cryo-s, Poland).

**RISULTATI**

La NRS è stata valutata ogni 6 ore il primo giorno, ogni 12 ore dal secondo al 7 giorno, in seguito ogni settimana fino al secondo mese.

La NRS nei primi 3 giorni è stata mediamente 4 (range 3-6), con necessità di paracetamolo 1 gr ogni 8 ore e ketoprofene 120 mg ogni 12 ore. In un caso è stato necessario aggiungere Ossicodone 10 mg ogni 24 ore.

Dal 4 giorno la NRS si è ridotta a 2-3 con necessità dimezzata di analgesia ev. Dal giorno 5 si è stabilizzata tra 1 e 2, arrivando di fatto a zero (range 0-2) dopo 1 settimana.

Non sono state osservate complicanze correlabili alla crionalgesia ed il dolore più acuto registrato è stato correlato alla permanenza del drenaggio toracico.

**CONCLUSIONI**

La crionalgesia perioperatoria intercostale rappresenta una tecnica sicura ed efficace.

Richiede skills specifiche in ambito di anestesia loco-regionale eco-guidata.

Nella nostra preliminare esperienza, la crionalgesia eseguita prima dell'intervento si è rivelata particolarmente efficace nel raggiungimento di un adeguato controllo antalgico nel postoperatorio sia precoce che tardivo.

La limitazione di questo studio è il campione ridotto dei pazienti trattati ma i risultati appaiono promettenti.

Sono necessari più casi e ulteriori applicazioni della crionalgesia in altri scenari (es. traumi del torace) per confermare questi risultati.

**CONSENSO**

Gli autori dichiarano di aver ottenuto il consenso informato alla pubblicazione dei dati relativi ai pazienti inclusi nel presente studio

**FIGURE**

*Fig.1 Criosonda e localizzazione ecografica dei nervi intercostali*

# A5

# MONITORAGGIO NEURO-EMODINAMICO MULTIMODALE DURANTE TEVAR DELL'ARCO AORTICO CON ENDOPROTESI RELAYPRO DOUBLE-BRANCH: LA PRIMA ESPERIENZA CLINICA IN REGIONE CAMPANIA E REVISIONE DELLA LETTERATURA

*E. Piscitelli[1], S. Notaro[1], T. Iovino[1], L. Golino[1], M. Caiazzo[1], M. Tamborino[1], C. Nollino[1], R.Orefice[1], D. Fiorillo[1] A. Riccio[1], A. Notaro[1], I. Vallifuoco[1], A. Luongo[2], L. Maresca[2], B. Di Benedetto[2], A. Imparato[1]*

*[1]UOC Anestesia, Rianimazione e TIPO -AORN Ospedali dei colli-Presidio Monaldi*
*[2]UOC Chirurgia vascolare-AORN Ospedali dei Colli-Presidio Monaldi*

## INTRODUZIONE

Il trattamento endovascolare delle patologie dell'arco aortico con protesi ramificate di ultima generazione, come la RelayPro™ double-branch (Terumo Aortic), consente la ricostruzione completa dell'arco con preservazione dei tronchi epiaortici. In tali procedure, la gestione anestesiologica assume un ruolo cruciale: l'ischemia cerebrale e l'instabilità emodinamica rappresentano le principali sfide intraoperatorie. L'impiego combinato di NIRS, BIS e monitoraggio PiCCO/Pulsion permette una guida dinamica della perfusione cerebrale e sistemica, anticipando alterazioni potenzialmente dannose e ottimizzando la protezione neurologica.

## CASO CLINICO E DESCRIZIONE DELL'INTERVENTO

Paziente di 76 anni con aneurisma dell'arco aortico (diametro 63 mm), trattato mediante impianto endovascolare RelayPro™ custom double-branch, con branch primario verso il tronco anonimo e secondario verso la carotide comune sinistra; arteria succlavia sinistra chiusa con Amplatzer Plug II 12×9 mm e stent Solaris carotideo bilaterale per ottimizzare i flussi epiaortici. Accessi carotideo destro e femorale destro, sotto anestesia generale e intubazione selettiva; durata procedura: 220 minuti. (Fig.1-sequenza eventi A-B-C-D)

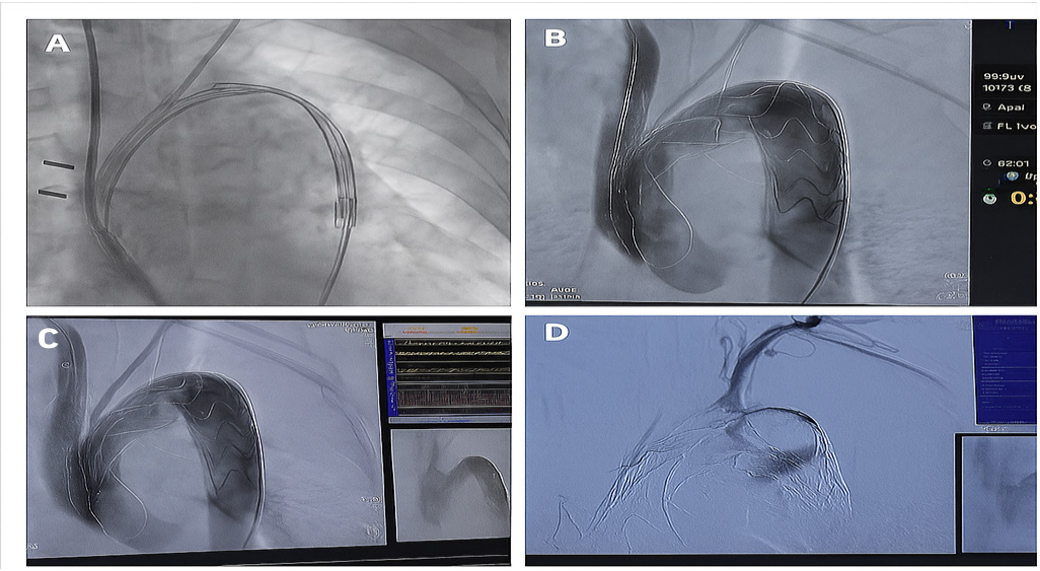


*Fig. 1 Angiografia intraoperaoratoria durate TEVAR con endograft a doppia branca RelayPro™: sequenze di rilascio e controllo finale della perfuzione epiaortica*

**MATERIALI E METODI**

L'anestesia generale è stata gestita con monitoraggio combinato (Fig.2)

- Pulsion PiCCO per parametri emodinamici (CI, SVV, SVRI, GEDI);
- BIS per la profondità anestetica;
- NIRS bilaterale per ossimetria cerebrale (Medtronic INVOS);
- Analisi emogas per $PaCO_2$ e Hb.

Il controllo è proseguito in ICU a 1h, 12h e 24h per valutare l'evoluzione emodinamica e neurologica.


*Fig. 2 Monitoraggio intraoperatorio multimodale: parametri emodinamici, NIRS bilaterale e BIS durante TEVAR dell'arco aortico*

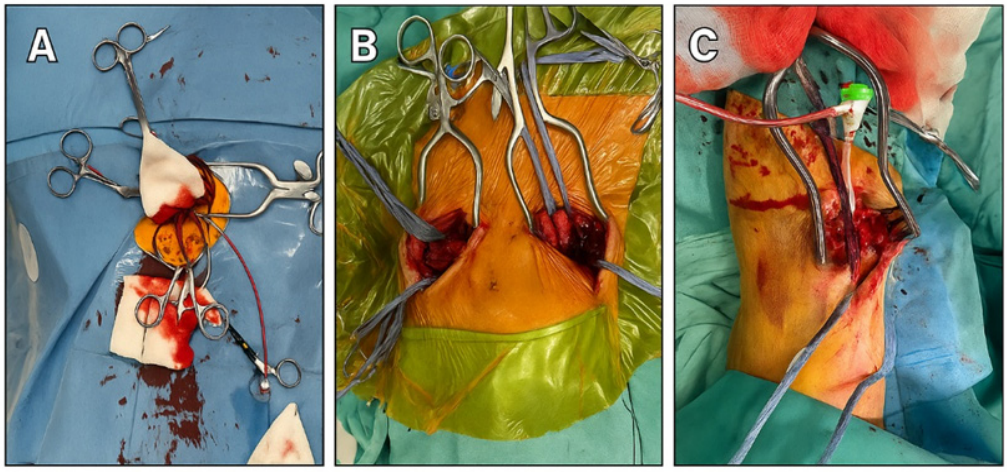


*Fig. 3 Accesso chirurgico bilaterale per eannulazione femorale durante TEVAR con endoprotesi RelayProTM. A) preparazione chirurgica B) esposizione dei vasi femorali C) cannulazione arteriosa e venosa*

## RISULTATI

Durante il rilascio della protesi si è registrato un calo transitorio del NIRS destro (–7%), corretto mediante incremento della MAP (>85 mmHg) e lieve ipercapnia controllata ($PaCO_2$ ≈ 44 mmHg). Il CI è rimasto stabile (2.3–2.7 L/min/$m^2$), con SVRI 1600–1800 dyn·s·$cm^{-5}$·$m^2$. In ICU, i valori NIRS sono tornati simmetrici (L 73%, R 74%), con GCS 15 e NIHSS 0 a 12h e 24h. Diuresi >1 mL/kg/h e progressiva sospensione della noradrenalina (0.1 --> 0 µg/kg/min) hanno confermato la stabilità emodinamica. La degenza in terapia intensiva è stata priva di complicanze neurologiche o respiratorie. (Fig.4)

R1 — Eventi intraop/ICU

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Fase | MAP | CI (L/min/m²) | SVV (%) | SVRI | GEDI (mL/m² | NIRS L (% | NIRS R (% | BIS | $PaCO_2$ | Hb | t (°C) | Diuresi | Nora | | GCS | NIHSS | Eventi intraop/ICU | Interventi correttivi | | |
| 2 | Induzione | 85 | 2,5 | 12 | 1700 | 770 | 70 | 71 | 52 | 38 | 12,4 | 36,3 | 100 | 0 | — | — | | Induzione stabile, lieve ipotensione corretta con NA | NA 0.04 µg/kg/min | | |
| 3 | Pre-rilascio | 80 | 2,4 | 10 | 1750 | 760 | 69 | 70 | 50 | 40 | 12,2 | 36,4 | 120 | 0,1 | — | — | | Stabilità generale | Monitoraggio continuo | | |
| 4 | Rilascio stent | 90 | 2,6 | 9 | 1600 | 740 | 66 | 64 | 47 | 44 | 11,9 | 36,2 | 110 | 0,1 | — | — | | Calo NIRS R -7% compensato ↑MAP e ↑$PaCO_2$ | Aumento NA + $PaCO_2$ 45 mmHg | | |
| 5 | Post-rilascio | 82 | 2,5 | 10 | 1650 | 755 | 70 | 69 | 49 | 42 | 12 | 36,4 | 130 | 0,1 | — | — | | Recupero NIRS simmetrico, CI stabile | Riduzione NA, normotermia | | |
| 6 | Fine procedur | 78 | 2,3 | 11 | 1800 | 780 | 68 | 68 | 54 | 39 | 11,8 | 36,6 | 140 | 0,1 | — | — | | Stabilità, sospensione progressiva NA | Weaning vasoattivo | | |
| 7 | ICU (1h) | 80 | 2,4 | 9 | 1720 | 765 | 71 | 72 | 70 | 41 | 11,7 | 36,8 | 80 | 0 | 15 | 0 | | Estubato, $O_2$ a occhialini 2–3 L/min, normocapnia | Analgesia multimodale, Fisioterapia respirator | | |
| 8 | ICU (12h) | 82 | 2,5 | 9 | 1700 | 760 | 72 | 73 | 85 | 39 | 11,6 | 36,8 | 110 | 0 | 15 | 0 | | Sveglio, in aria ambiente; mobilizzazione a letto | Idratazione controllata; PBM se necessario | | |
| 9 | ICU (24h) | 84 | 2,7 | 8 | 1680 | 750 | 73 | 74 | 95 | 38 | 11,9 | 36,9 | 150 | 0 | 15 | 0 | | Cammina con aiuto; sorveglianza neurologica negativa | Terapia standard, dimissione da ICU programm | | |
| 10 | Media ± DS / F | 83 ± 4. | 2.56 ± 0.14 (2. | 9.7 ± 1.3 ( | 1694 ± 6 | 760 ± 11 (74 | 70 ± 2.3 (( | 70 ± 3.5 (( | 65 ± 1( | 40.1 ± 2. | 11.95 ± | 36.6 ± | 118 ± 22 | 0.041 ± 0.03 (0–0.09) | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | |

*Fig. 4 Parametri pre e postoperatori, eventi e interventi correttivi*

## DISCUSSIONE E REVISIONE DELLA LETTERATURA

Negli ultimi anni l'introduzione di dispositivi branched e double-branched (RelayPro™, Nexus™, Thoraflex™) ha reso possibile la correzione endovascolare dell'arco aortico in pazienti selezionati ad alto rischio. Le serie multicentriche europee con RelayBranch e RelayPro riportano un successo tecnico >95% e incidenze di stroke 6–8%, valori sovrapponibili al registro italiano INARCHER (Nexus/Nexus Duo, 11 centri). Esperienze singolo-centro mostrano mortalità precoce <10% e outcomes neurologici favorevoli in pazienti trattati con perfusione cerebrale selettiva e attento controllo della pressione arteriosa.

Il monitoraggio cerebrale con NIRS si è dimostrato utile nel rilevare precocemente episodi di ipoperfusione cerebrale; variazioni ≥20% dal baseline correlano con deficit neurologici transitori in chirurgia aortica toracica. L'integrazione del monitoraggio emodinamico avanzato (PiCCO Getinge®) consente una regolazione continua del carico ventricolare e della pressione di perfusione. Le linee guida EACTS/STS 2024 raccomandano, nelle procedure di arco aortico, il mantenimento di MAP ≥85 mmHg, normotermia e $PaCO_2$ 40–45 mmHg come fattori protettivi. Nel caso presentato, la correzione immediata del calo NIRS destro mediante aumento della MAP e lieve ipercapnia ha permesso il recupero del flusso cerebrale senza deficit, confermando la validità dell'approccio "brain-oriented hemodynamic optimization" già evidenziato in studi recenti.

## CONCLUSIONI

Il monitoraggio combinato PiCCO–NIRS–BIS rappresenta una strategia efficace e riproducibile per ottimizzare la perfusione cerebrale e sistemica durante procedure endovascolari complesse dell'arco aortico. L'integrazione di target individualizzati per MAP e $PaCO_2$, insieme all'analisi in tempo reale delle variabili emodinamiche, può contribuire alla riduzione del rischio neurologico anche in centri non cardiochirurgici. Questo caso, coerente con le evidenze più recenti, rafforza il ruolo dell'anestesista nel coordinare la protezione neuro-emodinamica nei TEVAR dell'arco aortico.

## CONSENSO

Il paziente ha fornito consenso informato scritto alla pubblicazione di dati clinici e immagini a fini scientifici.

**RIFERIMENTI BIBLIOGRAFICI**


1. Czerny M, et al. Results of endovascular aortic arch repair using the Relay Branch system. Eur J Cardiothorac Surg. 2021;60(3):662–670.
2. Iglesias CI, et al. Early experience with Relay double-branched endograft for aortic arch repair. J Thorac Dis. 2023;15(4):1210–1219.
3. Antonello M, et al. Results from the Italian Nexus aRCH endovascular repair registry (INARCHER). J Vasc Surg. 2025;71(2):312–320.
4. D'Onofrio A, et al. Total Endovascular Aortic Arch Repair: From Dream to Reality. Medicina (Kaunas). 2022;58(3):372.
5. Mascia L, et al. Advanced hemodynamic monitoring and cerebral oximetry in thoracic aortic surgery: a multimodal approach. J Cardiothorac Vasc Anesth. 2023;37(5):1450–1460.
6. Thet MS, et al. Neuromonitoring during endovascular thoracoabdominal aortic aneurysm repair: a systematic review. Ann Vasc Surg. 2024;109:276–286.
7. Werner P, et al. Cerebral protection strategies in aortic arch surgery—Past, current evidence, and future innovation. J Clin Med. 2024;13(9):2500.
8. Leone N, et al. Anatomical suitability for branched endovascular aortic arch repair. J Vasc Surg. 2024;69(4):1080–1089.
9. Pang HJ, et al. Early outcomes of endovascular repairs of the aortic arch in high-risk patients. J Vasc Surg. 2024;70(6):1784–1793.
10. EACTS/STS Guidelines on aortic arch surgery and neuroprotection. Eur J Cardiothorac Surg. 2024;66(1):1–45.

# A6

## EFFECT OF LANDIOLOL INFUSION ON RIGHT VENTRICULAR-PULMONARY ARTERY COUPLING IN CARDIOGENIC SHOCK PATIENTS WITH ATRIAL FIBRILLATION


### AUTHORS

Giovanni Paissan[1], Marco Tosi[1], Silvia Finetto[1], Marco Pasetto[1], Lorenzo Peluso[1], Alessandro Russo[1], Leonardo Gottin[1]

[1] Cardiothoracic and Vascular Intensive Care Unit, Hospital and University Trust of Verona, P. le A. Stefani, 37124 Verona, Italy


### INTRODUCTION

Atrial tachyarrhythmias frequently coexist with heart failure (HF) progression and may precipitate cardiogenic shock (CS). Optimal management should focus on rate, rhythm, preload, afterload, and myocardial contractility, to improve the energetic and mechanical interaction of the circulation, namely ventricular–arterial coupling (VAC). The ultra–short-acting $\beta_1$-selective adrenergic blocker landiolol, is recommended for the management of atrial fibrillation (AF) and has demonstrated improvement in hemodynamic variables and clinical outcomes in patients with HF or CS with tachyarrhythmias.

### AIM

Evaluate the effect of landiolol infusion on RV VAC.

### METHODS

Prospective observational single-center cohort study, including adult patients admitted in our Center's Cardiothoracic and Vascular Intensive Care Unit, since March 2025, presenting with acute HF or CS and with tachyarrhythmias. Hemodynamic profile evaluation before (T0), at 1hour (T1) and 6 hours (T2) after landiolol infusion start, using minimally invasive pulse-contour monitoring and echocardiography. The most validated non-invasive measure of right VAC is the ratio of tricuspid annular plane systolic excursion (TAPSE) to pulmonary artery systolic pressure (PAPs).

### RESULTS

In this ongoing study, we enrolled 6 patients treated with landiolol for CS due to or aggravated by AF; median age was 66 [54-73] years. Three patients were cardiac surgery cases, 2 were CS evolved from secondary cardiomyopaties, 1 was an ARDS complicated by CS. One patient died in the ICU and another 1 in the hospital (both were withdrawal of life support therapies); the other 4 were discharged home. 4 cases were de novo AF (DNAF). In 2 patients (33%) landiolol was effective in restoring sinus rhythm; 2 of the 4 that remained in AF already had permanent AF at home. RV-pulmonary artery coupling improved in all patients (p=0.006, Friedman test – Figure 1), from a median 0,34 [0,19-0.46] mm/mmHg at T0 to a median 0,47 [0,20-0,71] mm/mmHg at T1 and to a median 0,52 [0,29-0,81] mm/mmHg at T2. TAPSE improved from median 10 [9,8-12,2] mm at T0 to median 13,1 [10-17] at T1 and median 14,7 [10,8-16,7] mm at T2 and PAPs decreased from median 35 [32-42] mmHg at T0 to median 29 [27-35] mmHg at T1 and median 27 [24-33] mmHG at T2. Right atrial pressure (RAP) also decreased from 17 [15-22] mmHg to 15 [14-21] mmHg at 1 hour and to 13 [12-18] mmHg at 6 hours. Landiolol median dose was 8 [5-11] mcg/kg/min.

**CONCLUSIONS**

These preliminary data showed that landiolol was effective in ameliorating RV mechanic and energetic performance in CS with AF.

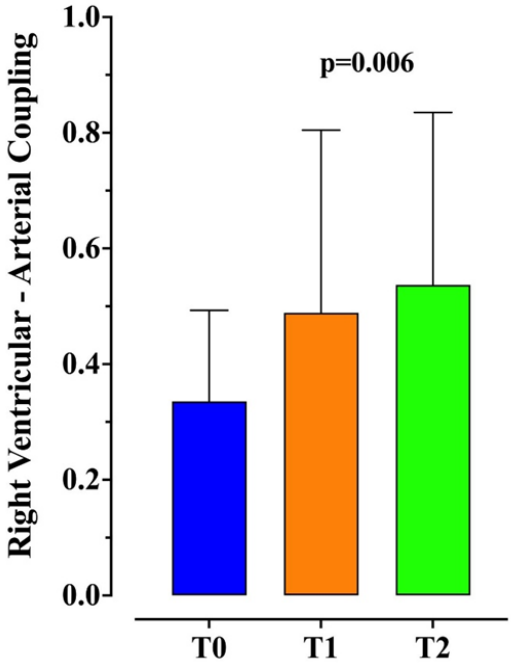


*Figure 1: improvement of right ventricle-pulmonary artery coupling during landiolol infusion.*

# A7

## 20% HUMAN SERUM ALBUMIN AS TREATMENT OF OXYGENATOR HIGH PRESSURES DURING CARDIOPULMONARY BYPASS IN CARDIAC SURGERY: A CASE REPORT.


### AUTHORS

S. Pedevilla[1], F. Annese[1], L. Pessetti[2*], R. Mandarano[2], S. Romagnoli[2], S. Bevilacqua[2]

[1] Department of Health Sciences, University of Florence, Florence, Italy;
[2] Cardiac Anaesthesia and Intensive Care, Department of Anaesthesia and Intensive Care, Careggi University Hospital, Florence, Italy;
[2*] Clinical Perfusionist, Careggi University Hospital, Florence, Italy



### ABSTRACT

High transmembrane oxygenator pressures during cardiopulmonary bypass (CPB) are rare but critical events that can compromise oxygenation and necessitate emergent oxygenator replacement. The underlying mechanisms of high-pressure excursions (HPE) during CPB are hypothesized to involve activation of the inflammatory response and coagulation cascade, platelet–leukocyte aggregation, and increased circuit resistance. The risk factors most frequently associated with HPE are male sex, large body surface area (BSA), elevated hematocrit (>28%) during CPB, a history of previous stroke and urgent or emergency surgery. The treatment protocol, advised by previous studies to manage transient increases in oxygenator inlet pressure, follows a stepwise approach. Initial measures include administration of heparin, with additional AT III if the activated clotting time (ACT) is <480 seconds. If pre-oxygenator pressure remains >500 mmHg with hematocrit >28%, hemodilution with crystalloids and albumin is recommended; instead, if pre-oxygenator pressure exceeds 500 mmHg with hematocrit <28%, administration of epoprostenol is indicated. We describe the case of a 69-year-old man undergoing combined coronary artery bypass grafting and aortic valve replacement who developed progressively increasing pre-oxygenator pressures approximately 30 minutes after CPB initiation (Tab. 1, Fig. 1).


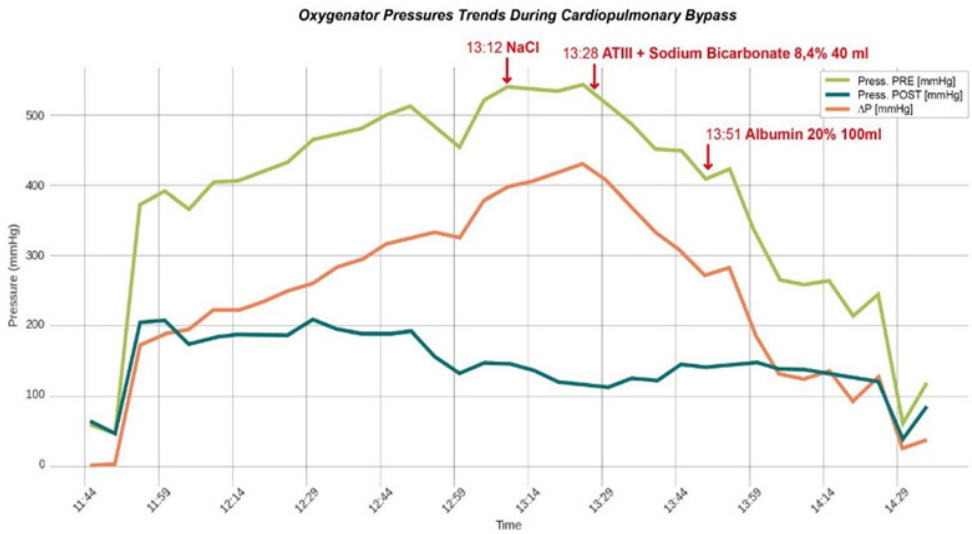


*Figure 1 Events registration during CPB.*

Conventional measures including hemodilution with crystalloids and administration of antithrombin III failed to improve pressures, which exceeded 500 mmHg. Following the administration of 100 mL of 20% human serum albumin, pre-oxygenator pressures, delta pressures and the ratio between flow and delta pressures progressively normalized within few minutes (Fig 1), allowing uneventful continuation of CPB and successful weaning. The patient postoperative course was uncomplicated. This case suggests that albumin may effectively reduce blood viscosity and enhance oxygenator performance in cases of high circuit pressures during CPB. Prompt recognition of rising oxygenator pressures and timely administration of 20% albumin may prevent oxygenator failure and improve intraoperative safety. Further studies and multicenter registries are warranted to better define the mechanisms underlying this phenomenon, validate the efficacy of albumin therapy, and establish standardized protocols for the safe and timely management of these critical intraoperative emergencies.

A formal written consent was acquired from the patient for data publication.

| Tempo | Press. PRE [mmHg] | Press. POST [mmHg] | ΔP [mmHg] | ArtFlow [l/min] | Flow/ΔP (l/min/mmHg) |
|---|---|---|---|---|---|
| 11:45:38 | 57 | 60 | -3 | 0.00 | — |
| 11:50:39 | 44 | 44 | 0 | 0.00 | — |
| 11:55:40 | 372 | 202 | 170 | 4.63 | 0.0272 |
| 12:00:42 | 391 | 205 | 186 | 4.84 | 0.0260 |
| 12:05:42 | 365 | 172 | 193 | 4.76 | 0.0247 |
| 12:10:43 | 403 | 181 | 222 | 5.07 | 0.0228 |
| 12:15:44 | 406 | 185 | 221 | 4.80 | 0.0217 |
| 12:20:45 | 418 | 186 | 232 | 4.80 | 0.0207 |
| 12:25:46 | 432 | 184 | 248 | 4.80 | 0.0194 |
| 12:30:47 | 464 | 206 | 258 | 4.67 | 0.0181 |
| 12:35:48 | 474 | 193 | 281 | 4.67 | 0.0166 |
| 12:40:48 | 481 | 187 | 294 | 4.54 | 0.0154 |
| 12:45:50 | 501 | 186 | 315 | 4.43 | 0.0141 |
| 12:50:51 | 513 | 190 | 323 | 4.45 | 0.0138 |
| 12:55:52 | 485 | 153 | 332 | 4.05 | 0.0122 |
| 13:00:53 | 454 | 130 | 324 | 3.74 | 0.0115 |
| 13:05:53 | 521 | 144 | 377 | 4.00 | 0.0106 |
| 13:10:55 | 542 | 144 | 398 | 4.00 | 0.0101 |
| 13:15:56 | 540 | 135 | 405 | 3.91 | 0.0097 |
| 13:20:56 | 535 | 118 | 417 | 3.91 | 0.0094 |
| 13:25:57 | 543 | 113 | 430 | 3.91 | 0.0091 |
| 13:30:58 | 514 | 110 | 404 | 3.91 | 0.0097 |
| 13:36:00 | 487 | 122 | 365 | 3.91 | 0.0107 |
| 13:41:00 | 450 | 119 | 331 | 3.91 | 0.0118 |
| 13:46:01 | 448 | 143 | 305 | 3.91 | 0.0128 |
| 13:51:01 | 408 | 139 | 269 | 3.95 | 0.0147 |
| 13:56:03 | 423 | 141 | 282 | 4.76 | 0.0169 |
| 14:01:04 | 330 | 145 | 185 | 3.87 | 0.0209 |
| 14:06:04 | 264 | 136 | 128 | 3.03 | 0.0237 |
| 14:11:06 | 257 | 135 | 122 | 3.03 | 0.0248 |
| 14:16:06 | 262 | 129 | 133 | 3.38 | 0.0254 |
| 14:21:08 | 212 | 123 | 89 | 2.45 | 0.0275 |
| 14:26:09 | 242 | 118 | 124 | 3.47 | 0.0280 |
| 14:31:09 | 57 | 35 | 22 | 0.71 | 0.0323 |
| 14:36:11 | 116 | 82 | 34 | 1.02 | 0.0300 |

# NOTES

**Società Italiana di Anestesia Analgesia**
**Rianimazione e Terapia Intensiva**
**Via del Viminale , 43**
**00184, Roma**

**ricerca@siaarti.it**

SIAARTI
PRO VITA CONTRA DOLOREM SEMPER