




Zavod za intenzivnu kardiološku skrb, aritmije i transplantacijsko liječenje Kliničkog bolničkog centra Zagreb

The Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology of the University Hospital Centre Zagreb

 Ana Marinić*,
 Vjera Pisačić,
 Valentina Jezl,
 Danijela Grgurević

Klinički bolnički centar
Zagreb, Zagreb, Hrvatska

University Hospital Centre
Zagreb, Zagreb, Croatia

RECEIVED:
July 16, 2019

ACCEPTED:
September 17, 2019



SAŽETAK: U Kliničkom bolničkom centru Zagreb kardiologija se kao supspecijalizacija počela izdvajati već pri osnivanju Klinike za unutarnje bolesti, a sam Zavod za bolesti srca i krvnih žila osnovan je 1974. godine s akademikom Vladimirom Goldnerom na čelu. Četrdeset četiri godine nakon niza brojnih uspjeha te osnivanja prvog Laboratorija za kateterizaciju srca u Hrvatskoj, postaje referentni centar za zatajivanje srca i transplantacijsku kardiologiju s akademikom Davorom Miličićem na čelu. Klinika za bolesti srca i krvnih žila u mnogočemu je vodeća kardiološka ustanova u Hrvatskoj u kojoj se provode postupci najsloženijeg liječenja kardioloških bolesnika. Zavod za intenzivnu kardiološku skrb, aritmije i transplantacijsku kardiologiju svakodnevno osigurava temeljnu skrb i visoko sofisticirane medicinske postupke za bolesnike iz Republike Hrvatske, ali i iz inozemstva. U osiguravanju kvalitetne skrbi svakako pomažu dostupna tehnološka rješenja i uređaji, ali njezina su osnova visoko specijalizirani i educirani zdravstveni djelatnici, osobito medicinske sestre / tehničari koji pružaju izravnu skrb bolesnicima. Trenutačno u Zavodu rade 43 medicinske sestre / tehničara na čelu s Danijelom Grgurević, bacc.med.techn., koja ih vodi od 2010. godine. Medicinske sestre / tehničari sudjeluju kao ravnopravni članovi multidisciplinarnog tima u svim dijagnostičko-terapijskim postupcima zbrinjavanja kardioloških bolesnika koji uključuju skrb za bolesnike nakon perkutane koronarne intervencije, predtransplantacijsku obradu i posttransplantacijsku skrb, zbrinjavanje bolesnika prije i nakon ugradnje dugotrajne mehaničke cirkulacijske potpore, skrb za bolesnika na izvantjelesnoj membranskoj oksigenaciji, postavljanje privremene elektrode i elektrostimulatora, perkutanu traheotomiju, perikardiocentezu te još mnogo drugih postupaka koje kardiološki bolesnici zahtijevaju. Također aktivno sudjeluju u radu Hrvatske udruge kardioloških medicinskih sestara, čija je osnivačica i predsjednica Ana Ljubas, mag. med. techn., koja dio radnog vijeka odrađuje u koronarnoj jedinici. Kao vodećoj ustanovi u Republici Hrvatskoj zadaća je sestara kontinuirano pratiti inovacije i nove smjernice kako bi se osigurala najbolja moguća skrb utemeljena na dokazima.

SUMMARY: At the University Hospital Centre Zagreb cardiology already began to stand out as a subspecialization when the Internal Medicine Clinic was opened, and the Institute for Cardiovascular Diseases itself was founded in 1974 and headed by Academician Vladimir Goldner. Forty-four years later, after many successes and the foundation of the first Laboratory for Heart Catheterization in Croatia, the institute became a referral center for heart failure and transplantation cardiology headed by Academician Davor Miličić. The Clinic for Cardiovascular Diseases is in many ways the leading cardiological institution in Croatia that performs the most complex treatment procedures for cardiological patients. The Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology continuously provides basic care as well as highly sophisticated medical procedures for patients from the Republic of Croatia and abroad. Ensuring high-quality care is certainly facilitated by the technological solutions and devices available at the institute, but it is made possible by highly specialized and educated healthcare professionals, especially 43 nurses headed by Danijela Grgurević, BN, who has headed the nursing service since 2010. Nurses participate in all the diagnostic and treatment procedures as equal members of the multidisciplinary team involved in the care for cardiological patients, including care after percutaneous coronary intervention, pre-transplantation processing and post-transplantation care, managing the patient before and after implantation of long-term mechanical circulation support, caring for patients on extracorporeal membrane oxygenation, temporary electrode and pacemaker implantation, and performing percutaneous tracheotomy, pericardiocentesis, and many other such procedures that cardiological patients require. Nurses also actively participate in the work of the Croatian Association of Cardiac Nurses, and the president and founder of that organization Ana Ljubas, MSN, also spends part of her working hours at the coronary unit. As part of the leading institution in the Republic of Croatia, our nurses have a duty to continuously adapt to innovations and new guidelines in the field in order to provide the best possible evidence-based care.

KLJUČNE RIJEČI: intenzivna kardiološka skrb, Hrvatska.

KEYWORDS: intensive coronary care, Croatia.

CITATION: *Cardiol Croat.* 2019;14(11-12):323-6. | <https://doi.org/10.15836/ccar2019.323>

***ADDRESS FOR CORRESPONDENCE:** Ana Marinić, Klinički bolnički centar Zagreb, Kišpatićeva 12, HR-10000 Zagreb, Croatia. / Phone: +385-92-1626-172 / E-mail: marinic.ana9@gmail.com

ORCID: Ana Marinić, <https://orcid.org/0000-0002-9349-8172> • Vjera Pisačić, <https://orcid.org/0000-0002-0395-7487>
Valentina Jezl, <https://orcid.org/0000-0002-7588-4571> • Danijela Grgurević, <https://orcid.org/0000-0002-2089-7463>

TO CITE THIS ARTICLE: Marinić A, Pisačić V, Jezl V, Grgurević D. The Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology of the University Hospital Centre Zagreb. *Cardiol Croat.* 2019;14(11-12):323-6. | <https://doi.org/10.15836/ccar2019.323>

TO LINK TO THIS ARTICLE: <https://doi.org/10.15836/ccar2019.323>

Brojni se uspjesi vežu za Kliniku za bolesti srca i krvnih žila od njezina osnutka. Danas Zavod za intenzivnu kardiološku skrb, aritmije i transplantacijsku kardiologiju čine Odjel za intenzivnu kardiološku skrb s osam kreveta, Odjel za transplantacijsku kardiologiju s devet kreveta te Odjel za aritmije s devet kreveta, odnosno Zavod se sastoji od ukupno 26 kreveta i u njemu se godišnje zbrine više od 2300 bolesnika. Hrvatska ima jednu od najrazvijenijih mreža intervencijskog liječenja akutnog infarkta miokarda u Europi, a Zavod za intenzivnu kardiološku skrb, aritmije i transplantacijsku kardiologiju nadležna je ustanova za zbrinjavanje bolesnika s područja Varaždinske te Bjelovarsko-bilogorske županije.

Odjel za intenzivnu kardiološku skrb opremljen je modernim monitoringom kojim se bolesnici istodobno prate u višekratnoj centralnoj stanici u kojoj se kontinuirano nadziru invazivno mjereni arterijski te centralni venski tlak. Osim bolesnika praćenih na stacionarnom monitoringu, prati se i 40 bolesnika na telemetrijama smještenima na odjelima Klinike za bolesti srca i krvnih žila, što im istodobno omogućuje slobodu kretanja te kontinuirano praćenje ritma i frekvencije na udaljenom monitoringu.

Na godišnjoj se razini zbrine 700 bolesnika, a primarno su to bolesnici s infarktomiokarda, malignim aritmijama, stanjima nakon kardiorespiratornog aresta te bolesnici u kardiogenom šoku. Sva ta stanja zahtijevaju žurnu dijagnostiku i liječenje, što omogućuje i suvremeno opremljen kateterizacijski laboratorij za urgentne perkutane koronarne intervencije.

Pružanje kvalitetne skrbi utemeljene na dokazima zahtijeva praćenje smjernica Europskoga kardiološkog društva koje Zavod za intenzivnu kardiološku skrb, aritmije i transplantacijsko liječenje dosljedno slijedi te zbog toga 2018. godine postaje Referentni centar Ministarstva zdravstva za akutno i intenzivno liječenje srčanih bolesnika te Referentni centar Ministarstva zdravstva za zatajivanje srca i transplantacijsku kardiologiju.

Suvremene metode liječenja bolesnika sa zatajivanjem srca u kojih medikamentna terapija nije učinkovita uključuju invazivne postupke poput transplantacije srca te mehaničku cirkulacijsku potporu. Prva je transplantacija srca izvedena 1988. godine, a do danas je presađba srca izvedena u 317 bolesnika s jednogodišnjim preživljenjem od 80%, odnosno petogodišnjim preživljenjem od 64 %¹, što Zavod čini vodećom ustanovom u zbrinjavanju bolesnika prije i nakon transplantacije srca, kako u Hrvatskoj, tako i u regiji.

U bolesnika u kojih je kontraindicirana transplantacija srca primjenjuju se suvremene metode mehaničke cirkulacijske potpore koja uključuje ugradnju uređaja za asistenciju lijevoj klijetki, uređaja za asistenciju desnoj klijetki te uređaja za asistenciju lijevoj i desnoj klijetki. Ugrađuju se *HeartMate II*, *HeartMate III*, *HeartWare*, *Reliant* te *Jarvick 2000*, a do danas je ugrađeno ukupno 87 srčanih crpki¹. Osoblje Zavoda provodi i edukaciju bolesnika i članova njihovih obitelji o skrbi i prilagodbi života nakon ugradnje mehaničke cirkulacijske potpore te transplantacije srca. Također se zbrinjavaju i bolesnici s komplikacijama na ugrađenim srčanim crpkama te bolesnici u fazi srčanog odbacivanja.

U liječenju osvjedočenog izvanbolničkog kardiorespiratornog aresta uzrokovanog poremećajem srčanog ritma tipa VF/VT (bez pulsa) primjenjuje se terapijska hipotermija endovaskularnom metodom pothlađivanja.

Many successes can be tied to the Clinic for Cardiovascular Diseases since its founding. Today the Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology is composed of the Department for Intensive Cardiological Care with 8 beds, the Department for Cardiological Transplantation with 9 beds, and the Department for Arrhythmia with 9 beds, for a total of 26 beds where more than 2300 patients are hospitalized annually. Croatia has one of the most developed networks for interventional treatment of acute myocardial infarction in Europe, and the Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology is the institution responsible for patients from the Varaždin County and Bjelovar-Bilogora County.

The Department for Intensive Cardiac Care is equipped with a modern monitoring system that simultaneously monitors patients at a multi-monitor central station that continuously tracks invasive arterial and central venous pressure measurements. In addition to the patients on stationary monitoring, 40 patients at other departments of the Clinic for Cardiovascular Diseases are also monitored telemetrically, which provides them with freedom of movement and continuous cardiac rhythm and frequency tracking with remote monitoring.

Approximately 700 patients are cared for annually, primarily patients with myocardial infarction, malignant arrhythmias, conditions arising after cardiorespiratory arrest, and patients in cardiogenic shock. All these states require rapid diagnostics and treatment, which is also facilitated by a modern catheter implantation laboratory for percutaneous coronary interventions.

Providing high-quality evidence-based care requires adhering to the guidelines by the European Society of Cardiology, which the Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology has consistently done, and has consequently become the Referral Center of the Ministry of Health for the Acute and Intensive Treatment of Cardiac Patients and the Referral Center of the Ministry of Health for Heart Failure and Transplantation Cardiology.

Modern treatment methods for patients with heart failure when medication therapy is not effective include invasive procedures such as heart transplants and mechanical circulatory support. The first heart transplantation at the Institute was performed in 1988, and 317 transplants have been performed to date with a one-year survival rate of 80% and a five-year survival rate of 64%¹, which makes the Institute the leading institution for the treatment of patients before and after heart transplantation both in Croatia and in the region.

In patients in whom heart transplantation is contraindicated we use modern methods for mechanical circulatory support that include the implantation of a left ventricular assist device, right ventricular assist device, or a biventricular assist device. The *HeartMate II*, *HeartMate III*, *HeartWare*, *Reliant*, and *Jarvick 2000* devices are used, and a total of 87 heart pumps have been implanted to date¹. The staff at the Institute also educates patients and their families on caring and adaptation after heart transplantation or implantation of mechanical circulatory support. We also treat patients with complications related to mechanical circulatory support or cardiac rejection.

Witnessed out-of-hospital cardiac arrest caused by ventricular fibrillation or ventricular tachycardia (no pulse) is treated with hypothermia using an endovascular cooling method.

Osim naprednih metoda liječenja srčanih bolesnika, dijagnostičko-terapijski postupci uključuju perikardiocentezu, pleuralnu punkciju, punkciju ascitesa, postavljanje privremene elektrode i elektrostimulatora, izvantjelesnu membransku oksigenaciju, intraortalnu balonsku pumpu te zbrinjavanje bolesnika nakon transkateterske implantacije aortalne valvule te nakon endovaskularne reparacije torakalne aorte.

Izvantjelesna membranska oksigenacija (engl. *Extracorporeal Membrane Oxygenation* – ECMO) primjenjuje se u životno ugroženih bolesnika kao privremena potpora cirkulaciji i/ili respiraciji te kao most do transplantacije, a godišnje se na ECMO potpori nalazi > 15 bolesnika. ECMO se počinje postavljati 2011. godine na Odjelu za intenzivnu kardiološku skrb, a od 2015. godine u postavljanju sudjeluje i kardiološki laboratorij.

Na Odjelu za intenzivnu kardiološku skrb medicinske sestre / tehničari sudjeluju pri perkutanoj traheotomiji te toaleti dišnih putova bronhoskopijom. Na godišnjoj razini na invazivnoj mehaničkoj ventilaciji zbrine se > 100 bolesnika, na neinvazivnoj mehaničkoj ventilaciji oko 70 bolesnika, a primjenjuje se i terapija visokim protokom kisika.

Godišnje se postavi više od 150 centralnih venskih katetera, a od 2018. godine postavljaju se i periferno postavljeni centralno venski kateteri (PICC kateteri).

U predtransplantacijskoj obradi te u zbrinjavanju hemodinamski nestabilnih bolesnika izvede se > 100 Swan-Ganzovih kateterizacija godišnje, a uveden je i manje invazivan PICCO sustav monitoriranja.

Valja naglasiti da se zbrinjavaju i bolesnici u terminalnim stadijima zatajavanja srca, kada su iscrpljene sve terapijske mogućnosti te se pristupa palijativnoj skrbi. Palijativni pristup podrazumijeva minimiziranje invazivnih procedura te usmjerenost na unaprjeđenje kvalitete života te prevenciju i ublažavanje patnje, a u tome sudjeluje multidisciplinarni tim.

Od osnutka koronarne jedinice do 1997. godine na mjestu glavne sestre radila se Amalija Vukušić, vms, koju je 1997. godine naslijedila Mira Peršić, vms. Od 2010. godine glavna sestra Zavoda za intenzivnu kardiološku skrb, aritmije i transplantacijsku kardiologiju je Danijela Grgurević, bacc. med. techn. Trenutačno su u Zavodu zaposlene 43 medicinske sestre / tehničara, od kojih je 22 prvostupnika sestriinstva, a 10 ih je u tijeku školovanja na preddiplomskom studiju sestriinstva te 2 na diplomskom studiju. Sestrinska je služba organizirana tako da svaka smjena ima 1 voditelja smjene prvostupnika sestriinstva čija su zadaće organizacija rada cjelokupne smjene i nadzor nad njim.

Na inicijativu pomoćnice za sestriinstvo Kliničkog bolničkog centra Zagreb Ane Ljubas, mag. med. techn., tadašnje glavne sestre Klinike za bolesti srca i krvnih žila, koja je i sama radom u koronarnoj jedinici prepoznala važnost edukacije i suvremenog pristupa u zdravstvenoj njezi kardioloških bolesnika, osnovana je 2007. godine Hrvatska udruga kardioloških medicinskih sestara. Od osnivanja udruge predsjednica je Ana Ljubas, mag. med. techn., dok je Danijela Grgurević, bacc. med. techn., obnašala funkciju tajnika udruge do 2018. godine, kada tu dužnost preuzima Valentina Jezl, bacc. med. techn.

Hrvatska udruga kardioloških medicinskih sestara aktivno sudjeluje na svim stručnim sastancima i kongresima unutar Hrvatske, ali i na međunarodnoj razini u sklopu Udru-

In addition to the advanced methods of treatment provided at the Institute, diagnostic procedures are also available and include pericardiocentesis, pleural puncture, abdominal puncture, temporary electrode and pacemaker implantation, extracorporeal membrane oxygenation, intra-aortic balloon pumps, and management of patients after transcatheter aortic valve implantation and after thoracic endovascular aortic repair.

Extracorporeal membrane oxygenation (ECMO) is used in patients with life-threatening conditions as temporary circulatory and/or respiratory support and a bridge to transplantation, with >15 patients on ECMO annually. ECMO was introduced in 2011 at the Department for Intensive Cardiac Care, and the cardiological laboratory has participated in ECMO implantation since 2015.

At the Department for Intensive Cardiac Care, nurses participate in percutaneous tracheotomy and bronchoalveolar lavage. Invasive mechanical ventilation is used to manage >100 patients annually, whereas non-invasive mechanical ventilation is used in about 70 patients; high flow oxygen therapy is used as well.

Over 150 central venous catheters are implanted every year, and peripherally inserted central catheters (PICCs) have been applied since 2018.

Over 100 Swan-Ganz catheterizations are performed annually in pre-transplantation processing and management of hemodynamically unstable patients, and a less invasive PICCO monitoring system has been introduced as well.

It should be emphasized that we also manage patients in the terminal stages of heart failure when all treatment options have been exhausted and only palliative care is possible. The palliative approach consists in minimizing invasive procedures and focusing on improving quality of life and preventing and reducing suffering, which is handled by a multidisciplinary team.

The position of head nurse was held by senior nurse Amalija Vukušić, since the founding of the coronary unit until 1997 when she was succeeded by senior nurse Mira Peršić. Danijela Grgurević, BN has been the head nurse of the Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology since 2010. There are currently 43 nurses employed at the Institute, of which 22 have a bachelor's degree in nursing, 10 are attending a nursing course, and 2 are attending a graduate course in nursing. Nursing service is organized so that every shift has 1 shift chief with a bachelor's degree whose task it is to organize and supervise the work of the whole shift.

The Croatian Association of Cardiac Nurses was founded in 2007 thanks to the initiative of Ana Ljubas, MSN, the current director assistant for nursing of the University Hospital Centre Zagreb and the head nurse of the Clinic for Cardiovascular Diseases at the time who recognized the importance of education and a modern approach to healthcare for cardiological patients. Since its foundation Ana Ljubas, MSN has been the association's president, whereas Danijela Grgurević, BN has been the association's secretary until 2018 when the role was taken over by Valentina Jezl, BN.

The Croatian Association of Cardiac Nurses actively participates in all expert meeting and congresses both in Croatia and at the international level as part of the Association of

ženja kardiovaskularnih sestara i srodnih zanimanja (engl. *Association of Cardiovascular Nursing & Allied Professions* – ACNAP) koje djeluje kao samostalna organizacija unutar ESC-a.

Medicinske sestre / tehničari Zavoda za intenzivnu kardiološku skrb, aritmije i transplantacijsku kardiologiju aktivno sudjeluju na svim stručnim događanjima u sklopu udruge radovima iz područja zdravstvene njege kardiološkog bolesnika u obliku stručnih radova te prikaza slučaja koji pokrivaju teme iz suvremene njege, od mehaničke ventilacije, hipotermije, mehaničke cirkulacijske potpore, a prate i trendove u sestrinskoj praksi radi povećanja sigurnosti bolesnika i kvalitete u procesu rada, s posebnim naglaskom na prevenciju i praćenje intrahospitalnih infekcija. Također se prate svi neželjeni događaji, posebice pad, dekubitus i flebitisi.

S posebnim naglaskom na kontinuiranu edukaciju osoblja te uz implementaciju svih tehnoloških dostignuća moderne medicine u kliničku praksu, Zavod za intenzivnu kardiološku skrb, aritmije i transplantacijsku kardiologiju KBC-a Zagreb suvereno prati najsuvremenija kretanja u liječenju i zbrinjavanju kardioloških bolesnika, što je čini jednom od vodećih kardioloških ustanova, ne samo u zemlji nego i u regiji.

Cardiovascular Nursing & Allied Professions (ACNAP), which works as an independent organization within ESC.

Nurses at the Institute for Intensive Cardiac Care actively participate in all professional events as part of the association with contributions from the field of healthcare for cardiologic patients in the form of professional papers and case reports that cover topics from modern care such as mechanical ventilation, hypothermia, and mechanical circulatory support, while also following trends in nursing practice in order to improve patient safety and work quality, with a special emphasis on prevention and monitoring of intrahospital infections. All unwanted events are monitored as well, especially falls, decubitus, and phlebitis.

With a special emphasis on continuous education of personnel and implementation of all technological advancements available to modern medicine into clinical practice, the Institute for Intensive Cardiac Care, Arrhythmia, and Transplantation Cardiology closely follows the most modern trends in the treatment and management of cardiologic patients, which makes it one of the leading cardiologic institutions both in the country and in the region.

LITERATURE 

1. Registar Zavoda za intenzivnu kardiološku skrb, aritmije i transplantacijsku kardiologiju, Klinički bolnički centar Zagreb, 2019.