NICaS®

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Clinical Summary.

NICaS Hemodynamic NAVIGATOR™

In NI Medical we value clinical validation through studies and verification. NICaS has participated in a variety of independently led clinical studies in different specialties such as Cardiology, Technological Validation, ICU, OBGYN, Neonatal, Dialysis and more. Here is a collection of our clinical publications - feel free to approach us with any other queries you have.

The NI Medical team

Fields.

Cardiology.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
Cardiology /Validation	Baseline Granov goor index predicts acute hemodynamic improvement during CRT opptimization	Stefan Bogdan MD, Israel Mazin MD, Igor lipchenca MD, David Barlev MD, Osnat Gurevitz MD, Ilan nof MD, Ilan golgenberg MD, Sahi Ben-Zkry MD, Roy Beinart MD.Heart Center, Sheba Hospital, Ramat-Gan, Israel	2015	Cardiac resynchronization therapy optimization can be performed using the NICaS .This study sought to define predictors for acute hemodynamic improvement during NICaS guided CRT optimization. Baseline GGI predicted acute hemodynamic improvement during NICaS guided CRT optimization. A baseline of 11.5 could be possibly used in order to outline those who may benefit from NICaS guided CRT optimization.	https://program.eventact.com/Agenda/Lecture/91429?code=1436523	CL004
Cardiology /Validation/ICU	Detection of left ventricular systolic dysfunction using a newly developed, laptop based, impedance cardiographic index	Yoseph Rozenman, Renee Rotzak, Robert P. Patterso, University of Minnesota, USA	2011	Careful observation of the data points suggests that rather than a simple correlation, the relation between EF and GGI is more like a step function with a GGI<10 corresponding to a wide range of EF<55%. The GGI can accurately detect LVSD in subjects at risk (referred for echocardiography).	https://pubmed.ncbi.nlm.nih.gov/21396726/	CL010
Cardiology /ICU	A noninvasive stroke volume monitoring for early detection of minimal blood loss.	Danny Epstein, Ariel Ginzburg, Saar Sharon, Shai Kiso, Yuval Glick, Erez Marcuson, Yehuda Daniel Glass, Asaf Miller, Saar minha, Ariel Furer. Rambam Health Care Campus, Israel; Medical Corps, Israeli Defense Forces, Tel-Hashomer, Israel;	2020	Our study suggests that continuous monitoring of SV may be more useful than either the HR, BP, or shock index in identifying patients with early acute blood loss. As an operator-independent, point-of-care and easy-to-use technology, the SV whole body bio-impedance measurement may serve as an important tool when monitoring a potentially bleeding patient or performing casualty triage.	https://pubmed.ncbi.nlm.nih.gov/32769818/	CL022
Cardiology /Validation	non-invasive measurement of cardiac output by whole body bio-impedance during dobutamine stress echocardiography: Clinical implications in patients with left ventricular dysfunction and ischemia	Marina Leitman, Edgar Sucher ,Edo Kaluski ,Ruth Wolf ,Eli Peleg , Yaron Moshkovitz ,Olga Milo-Cotter ,Zvi Vered, Gad Cotter.The Sackler Faculty of Medicine, Tel Aviv University, Israel. Assaf-Harofeh Medical Center.	2006	The correlation between non-invasive CI as determined by NICaS and echocardiography was 0.81. Measurement of CI by NICaS correlated well with Doppler derived CI. The calculation of Cpi and TPRI changes during dobutamine stress may provide important clinical information.	https://pubmed.ncbi.nlm.nih.gov/16199201/	CL018

Cardiology.

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Cardiology /ICU	Non invasive measurements of cardiac output (CO) and cardiac power index (CPI) by whole body bio impedance in patients with heart failure.	P Pellicori, E Wright, P Costanzo, S Smith, S Rimmer, J Hobkirk, A Torabi, T Mabote , J Warden , JGF Cleland, Department of Academic Cardiology Hull ,UK.	2012	In patients with HF and sinus rhythm, whole body bioimpedance might be a useful method of monitoring the hemodynamic severity of heart failure that is quick, simple and inexpensive. Whether it is as or more useful than NTproBNP as a marker of outcome awaits the results of large long-term studies.	https://spo.escardio.org/Abstract.aspx?eevtid=53&fp=P520	CL019
Cardiology /ICU/Validation	Go with the flow	No authors listed (review article by ECRI Institute)	2013	Thermodilution using a pulmonary artery catheter is considered the gold standard In measuring cardiac output. However, Drawbacks associated with the technique have Prompted clinicians to seek less invasive options. But these alternatives have their own Limitations. We examine the evidence on four devices that measure cardiac output using. All six studies found good correlation between the NICaS and the referred method (thermodilution). In two studies NICaS was found more accurate than thoracic impedance cardiography.	https://pubmed.ncbi.nlm.nih.gov/23901430/	CL011
Cardiology /ICU/Validation	Whole-body electrical bio-impendance is accurate in non invasive determination of cardiac output: A thermodilution controlled,	Guillermo Torre-Amiot MD, Gad Cotter MD, Zvi Vered MD, Edo Kaluski MD, Karl Stang MD, Baylor College of Medicine, Houston, TX, USA, Assaf-Harofeh Medical Center, Israel and Charite Campus, Berlin, Germany.	2004	NICaS is a novel accurate noninvasive method for CO determination. The results of this study suggest that the NICaS might be more accurate then thermodilution for CO determination due to the tendency of thermodilution to under estimate CO when high and over estimate it when low.	https://www.onlinejcf.com/article/S1071-9164(04)00208-8/fulltext	CL024
Cardiology /Pharma	A Phase 2a dose-escalation study of the safety, tolerability, pharmacokinetics and hemodynamic effects of BMS-986231 in hospitalized patients with heart failure with reduced ejection fraction	Cristina Tita, Edward M Gilbert, Adrian B Van Bakel, Jacek Grzybowski, Garrie J Haas, Mohammad Jarrah, Stephanie H Dunlap, Stephen S Gottlieb, Marc Klapholz, Parag C Patel , Roman Pfister, Tim Seidler, Keyur B Shah, Tomasz Zieliński, Robert P Venuti, Douglas Cowart, Shi Yin Foo, Alexander Vishnevsky, Veselin Mitrovic. Sponsor:BMS	Oct-17	BMS-986231 demonstrated a favorable safety and hemodynamic profile in patients hospitalized with advanced heart failure. Based on preclinical data and these study's findings, it is possible that the hemodynamic benefits may be mediated by inotropic and/or lusitropic as well as vasodilatory effects. Sponsor:BMS	https://pubmed.ncbi.nlm.nih.gov/28677877/	CL030

Cardiology.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
Cardiology /Validation	Comparison of stroke volume measurements during hemodialysis using bioimpedance cardiography and echocardiography	Michael J. Germain, Jyovani Joubert, Daniel O'Grady, Brian H. Nathanson, Yossi Chait, Nathan W. Levin. University of Massachusetts, Amherst, MA, USA	Aug-17	NiCaS SV measurements are similar to and strongly correlated with Echo SV measurements. This suggests that noninvasive NiCaS technology may be a practical method for measuring SV during HD.	https://onlinelibrary.wiley.com/doi/abs/10.1111/hdi.12589	CL032
Cardiology /Validation	Non-Invasive Hemodynamic Whole-Body Bioimpedance Indices for the Early Detection of Cancer Treatment-Related Cardiotoxicity: A Retrospective Observational Study	Nili Schamroth Pravda, Shaul Lev, Osnat Itzhaki Ben Zadok, Ran Kornowski, Zaza Iakobishvili. The Sackler Faculty of Medicine, Tel Aviv University, Israel.	Sep-19	GGI, a parameter measured by WBI, can reliably correlate to biomarker evidence of heart failure in patients after chemotherapy. Its use as a screening tool for cardiotoxicity in patients with ongoing anticancer therapy is promising.	https://pubmed.ncbi.nlm.nih.gov/32036358/	CL034
Cardiology /Validation	Impedance cardiography in the evaluation of the hemodynamic profile in dilated heart disease. Cross-sectional study in a public hospital in Ecuador	María Carolina Duarte Martínez, Carlos Andres Peñaherrera, Ernesto Peñaherrera Patiño. Universidad Católica de Santiago de Guayaquil, Guayaquil, Ecuador	Jun-15	Chronic arterial hypertension is the main cause of dilated heart disease in our country. These patients have decreased hemodynamic heart pump patterns (systolic dysfunction), and increased total peripheral resistance, as would be expected. Cardio impedance is an effective, comfortable, and non-invasive method in the approach to cardiovascular diseases.	https://rmedicina.ucsg.edu.ec/index.php/ucsg-medicina/article/view/817	CL036
Cardiology /Validation	Early post-stress decrease in cardiac performance by impedance cardiography and its relationship to the severity and extent of ischemia by myocardial perfusion imaging	Ronen Goldkorn,corresponding author Alexey Naimushin, Eli Rozen and Dov Freimark. Sheba Hospital ,The Sackler Faculty of Medicine, .Tel Aviv University, Israel	Jul-20	The results of the present study suggest that the immediate post-stress changes in several hemodynamic parameters as detected by the NICaS can be used as an important adjunct to the diagnostic approach for the early detection of myocardial ischemia. These findings can be used to improve risk assessment prior to a decision regarding the need to proceed with more complex and costly imaging modalities for the detection of myocardial ischemia. Moreover, future research should explore the potential use of the NICaS generated parameters as prognostic markers in the development and evolution of CAD.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7394672/	CL041

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Cardiology /Validation/ICU	Cardiac Power Is the Strongest Hemodynamic Correlate of Mortality in Cardiogenic Shock: A Report from the SHOCK Trial Registry	Rupert Fincke, MD,Judith S. Hochman, MD, FACC, April M. Lowe, MS, Venu Menon, MD, FACC,§ James N. Slater, MD, FACC, John G. Webb, MD, FACC, Thierry H. LeJemtel, MD, FACC,Gad Cotter, MD, FACC,for the SHOCK Investigators. Cardiology Department, Assaf-Harofeh Medical Center, Israel	2004	The measurement of CO by whole body electrical bioimpedance is accurate with the exception of diseases of the aorta and aortic valve and significant peripheral edema. It may also avoid the potential overestimation of CO by thermodilution in low CO states. Cardiac power is a novel hemodynamic measure. By incorporating both flow and pressure domains, it represents the cardiac pumping ability. In the present study, cardiac power is the strongest hemodynamic correlate of outcome for patients in cardiogenic shock.	https://pubmed.ncbi.nlm.nih.gov/15261929/	CL008
Cardiology /Validation/ICU	Detection of left ventricular systolic dysfunction using a newly developed, laptop based, impedance cardiographic index	Yoseph Rozenman, Renee Rotzak, Robert P. Patterson. University of Minnesota, USA	2011	Careful observation of the data points suggests that rather than a simple correlation, the relation between EF and GGI is more like a step function with a GGI<10 corresponding to a wide range of EF<55%. The GGI can accurately detect LVSD in subjects at risk (referred for echocardiography).	https://pubmed.ncbi.nlm.nih.gov/21396726/	CL010

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Cardiology /Validation/ICU	Non-invasive and simple assessment of cardiac output and pulmonary vascular resistance with whole-body impedance cardiography is useful for monitoring patients with pulmonary hypertension.	Yu Taniguchi MD, Noriaki Emoto MD, PHD, Kazuya Miyagwa MD, PHD,Kazuhiko Nakayama MD,PHD, Hiroto Kinutani MD, Hidekazu Tanaka MD PHD. Kobe University Hospital	2013	Right heart catheterization (RHC) is the gold standard for the diagnosis of pulmonary hypertension (PH) and a useful tool for monitoring PH. However, there are some disadvantages in the regular use of RHC because it is invasive. Noninvasive methods for monitoring hemodynamics are needed to manage patients with PH. Noninvasive measurement of CO and PVR using NICaS is as reliable as invasive RHC. This simple assessment could help physicians to manage their patients with PH.	https://pubmed.ncbi.nlm.nih.gov/23759655/	CL017
Cardiology /Validation	Non-invasive measurement of cardiac output by whole body bio-impedance during dobutamine stress echocardiography: Clinical implications in patients with left ventricular dysfunction and ischemia	Marina Leitman, Edgar Sucher ,Edo Kaluski ,Ruth Wolf ,Eli Peleg , Yaron Moshkovitz ,Olga Milo-Cotter ,Zvi Vered, Gad Cotter. Assaf-Harofeh Medical Center, Israel.	2006	The correlation between non-invasive CI as determined by NICaS and echocardiography was 0.81. Measurement of CI by NICaS correlated well with doppler derived CI. The calculation of Cpi and TPRI changes during dobutamine stress may provide important clinical information.	https://pubmed.ncbi.nlm.nih.gov/16199201/	CL018

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Cardiology /Validation/ICU	The reliability of noninvasive cardiac system hemodynamic monitoring in the cardiac intensive care patient requiring mechanical circulatory support.	G.Tavvazi, A.Fernandez-Gasalla, A.Barradas-Pires, Y.Mebrate, S. Price. University of Pavia, Barcelona, Spain. Royal Brompton, Imperial College London, UK.	2015	Both pearson correlation and linear regression demonstrated an excellent correlation between CO measured by echo and the NICaS. NICaS looks to be a reliable noninvasive CO monitoring in ICU patients.	https://www.researchgate.net/publication/283515078_The_reliability_of_Non-Invasive_Cardiac_System_NICaS_haemodynamic_monitoring_in_the_Cardiac_Intensive_Care_Patient_requiring_mechanical_circulatory_support	CL023
Cardiology /Validation/ICU	Whole-body electrical bio-impendance is accurate in non invasive determination of cardiac output: A thermodilution controlled. a thermodilution controlled, prospective, double blind evaluation.	Guillermo Torre-Amiot MD, Gad Cotter MD, Zvi Vered MD, Edo Kaluski MD, Karl Stang MD. Baylor College of Medicine, Houston, TX, USA, Assaf-Harofeh Medical Center, Israel and Charite Campus, Berlin, Germany.	2004	NICaS is a novel accurate noninvasive method for CO determination. The results of this study suggest that the NICaS might be more accurate then thermodilution for CO determination due to the tendency of thermodilution to under estimate CO when high and over estimate it when low.	https://www.onlinejcf.com/article/S1071-9164(04)00208-8/fulltext	CL024
Cardiology /Validation	Abstract 11939: Validation of Non-invasive Cardiac System (NICaS) Derived Stroke Volume With Cardiac Magnetic Resonance	Pedram Hassan-Tash, Umar Ismail, Gurkirat Chana, Iain Kirkpatrick, Davinder S Jassal, Brett Hiebert, Amir Ravandi, Malek Kass, Ashish H Shah. ST Bonifase Hospital, Manitoba, Canada.	2019	Stroke volume measured using NICaS strongly correlated with that from CMR. NICaS also demonstrated strong consistency in SV derived at different time points in the same individual.	https://www.ahajournals.org/doi/10.1161/circ.140.suppl_1.11939	CL028
Validation /Neonatal	Continuous non-invasive measurement of stroke volume and cardiac index in infants and children: comparison of Impedance Cardiography NICaS® vs CardioQ® method	R Beck, L Milella, C Labellarte. Bari Hospital, Pediatric Dpt. , Italy	Jun-18	Good correlation was observed in pediatric patients for CI measured with NICaS® in comparison with CardioQ® device. Continuous non-invasive monitoring of NI-CI can be particularly interesting for the pediatric population.	https://pubmed.ncbi.nlm.nih.gov/29938742/	CL029
Cardiology /Validation	Comparison of stroke volume measurements during hemodialysis using bioimpedance cardiography and echocardiography	Michael J. Germain, Jyovani Joubert, Daniel O'Grady, Brian H. Nathanson, Yossi Chait, Nathan W. Levin. University of Massachusetts & Mount Sinai Icahn School of Medicine NY.	Aug-17	NiCaS SV measurements are similar to and strongly correlated with Echo SV measurements. This suggests that noninvasive NiCaS technology may be a practical method for measuring SV during HD.	https://onlinelibrary.wiley.com/doi/abs/10.1111/hdi.12589	CL032

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Infectionus diseases/ Validation	The role of noninvasive hemodynamic monitoring in the evaluation of acute and severe pesticide poisoning	Gao Xun, Chen Mingli, Wang Yufeng, Zhu Qianqian, Zhu Baoyue, Wang PuKong Fantuo, Wang Weizhan.	Dec-20	NICaS can effectively monitor the hemodynamic indexes of patients with acute pesticide poisoning.	https://europepmc.org/article/med/33406543	CL035
Cardiology /Validation	Impedance cardiography in the evaluation of the hemodynamic profile in dilated heart disease. Cross-sectional study in a public hospital in Ecuador	María Carolina Duarte Martínez, Carlos Andres Peñaherrera, Ernesto Peñaherrera Patiño. Universidad Católica de Santiago de Guayaquil, Guayaquil, Ecuador	Jun-15	Chronic arterial hypertension is the main cause of dilated heart disease in our country. These patients have decreased hemodynamic heart pump patterns (systolic dysfunction), and increased total peripheral resistance, as would be expected. Cardio impedance is an effective, comfortable, and non-invasive method in the approach to cardiovascular diseases.	https://rmedicina.ucsg.edu.ec/index.php/ucsg-medicina/article/view/817	CL036
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ICU.

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ICU	Cardiac power index is the best hemodynamic parameter to predict 6 month mortality in non septic ICU patients	Shaul Lev MD, Gal Shahaf-Levin MD. Rabin Medical Center, Israel.	2017	The finding of the present study suggests that non invasively CPI, measured by whole body bioimpedance, could serve as a reliable screening parameter to identify patients with high probability of death within 6 month. A cut off CPI value of lower than 0.30 w/m2 was found to be best 6 month mortality predictor.	NA- poster from ACCA	CL007
Cardiology/ Validation/ICU	Cardiac Power Is the Strongest Hemodynamic Correlate of Mortality in Cardiogenic Shock: A Report from the SHOCK Trial Registry	Rupert Fincke, MD,Judith S. Hochman, MD, FACC, April M. Lowe, MS, Venu Menon, MD, FACC,§ James N. Slater, MD, FACC, John G. Webb, MD, FACC, Thierry H. LeJemtel, MD, FACC,Gad Cotter, MD, FACC,for the SHOCK Investigators. New York, New York; Watertown, Massachusetts; Chapel Hill and Durham, North Carolina; and Vancouver, Canada.	2004	The measurement of CO by whole body electrical bioimpedance is accurate with the exception of diseases of the aorta and aortic valve and significant peripheral edema. It may also avoid the potential overestimation of CO by thermodilution in low CO states. Cardiac power is a novel hemodynamic measure. By incorporating both flow and pressure domains, it represents the cardiac pumping ability. In the present study, cardiac power is the strongest hemodynamic correlate of outcome for patients in cardiogenic shock.	https://pubmed.ncbi.nlm.nih.gov/15261929/	CL008
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Cardiology/ICU	Non invasive measurements of cardiac output (CO) and cardiac power index (CPI) by whole body bio impedance in patients with heart failure. A report from SICAHF study (FP7/20072013/241558)	P Pellicori, E Wright, P Costanzo, S Smith, S Rimmer, J Hobkirk, A Torabi, T Mabote , J Warden , JGF Cleland. Department of Academic Cardiology Hull ,UK.	2012	In patients with HF and sinus rhythm, whole body bioimpedance might be a useful method of monitoring the hemodynamic severity of heart failure that is quick, simple and inexpensive. Whether it is as or more useful than NTproBNP as a marker of outcome awaits the results of large long-term studies.	https://spo.escardio.org/Abstract.aspx?eevtid=53&fp=P520	CL019

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ICU.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
Cardiology/ICU	Whole-body bioimpedance monitoring for outpatient chronic heart failure follow up	Yusuke Tanino, Junya Shite, Oscar L Paredes, Toshiro Shinke, Daisuke Ogasawara, Takahiro Sawada, Hiroyuki Kawamori, Naoki Miyoshi, Hiroki Kato, Naoki Yoshino, Ken-ichi Hirata. Cardiology Dpt.Kobe University Hospital,Japan.	2009	CI, SVR and TSVR are important hemodynamic parameters for the prognosis of chronic heart failure (CHF), they are difficult to measure in an outpatient setting. Whole body bioimpedance monitoring using a Non-Invasive Cardiac System (NICaS) allows easy, non-invasive estimation of these parameters. Here, whether NICaS-derived hemodynamic parameters are clinically significant was investigated by relating them to other conventional cardiovascular functional indices, and by evaluating their predictive accuracy for CHF readmission. Hemodynamic parameters derived by NICaS found to be useful for the non invasive assessment of cardiac function in outpatient CHF follow up.	https://www.jstage.jst.go.jp/article/circj/73/6/73_CJ-08-0847/_article/-char/ja/	CL025

OBGYN.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
OBGYN	Cardiac hemodynamics in labor and postpartum - a new look into physiology	Eran Ashwal,Liran Hiersch, Yehuda Pauzner, Avital Wertheimer, Amir Aviram, Arnon Wiznitzer, Yariv Yogev. Helenn Schneider hospital for women, Rabin Medical Center, Obstretics and Gynocology, Petach-Tikva, Israel.	2015	The Study assess hemodynamic changes throughout labor and early postpartum period. In the latent phase there is a decrease of CI, CO, SV, HR and an increase of TPR. The active phase was characterized by an increase of CI, CO, SV, HR and a decrease of TPR. The hemodynamic physiology of labour is characterized by significant changes between the latent phase and the active phase followed by a relative constant state throughout labor and an opposite change within 48 hours postpartum.	https://www.ajog.org/article/S0002-9378(14)01412-4/pdf	CL005
OBGYN	Cardiac index in pregnancy - friend or foe	Maya Ram, Anat Lavie, Shaul Lev, Yair Blecher, Yael Shulman, Tomer Avnon, Eran Weiner, Ariel Many. Helen Schineider Hospital for women, Rabin Medical Center, Petach Tikva, Israel	2016	The purpose of the study was to assess the reliability of CO vs. CI in healthy pregnant women at term. The pearson correlation between the BSA and CO was poor. The researchers found that in pregnant women the reliable hemodynamic parameter is CO and not CI.	https://www.ajog.org/article/S0002-9378(15)01873-6/abstract	CL006
OBGYN	Cardiac hemodynamics before, during and after elective cesarean delivery, do we really know it all?	Maya Ram, Anat Lavie, Shaul Lev, Yair Blecher, Yael Shulman, Tomer Avnon, Eran Weiner, Ariel Many. Helen Schineider Hospital for women, Rabin Medical Center, Petach Tikva, Israel	2016	The researchers found that 3 min after delivery CO reaches a peak and TPR reaches a low. The placenta plays a major resistance role that sets the hemodynamic changes during these moments.	https://www.ajog.org/article/S0002-9378(15)02194-8/fulltext	CL013
OBGYN	Maternal cardiac hemodynamics in normotensive VS pregnancies with preeclampsia- did we find a helpful tool?	Maya Ram, Anat Lavie, Shaul Lev, Yair Blecher, Yael Shulman, Tomer Avnon, Eran Weiner, Ariel Many. Helen Schineider Hospital for women, Rabin Medical Center, Petach Tikva, Israel	2016	Before CS (cesarean section) - CO of control group was higher then the study group and the TPR of the control group was lower then the study group. After CS – both groups CO and TPR reached the same values. The accuracy and non-invasiveness of the NICaS opens a window of opportunity, aiding in evaluating and separating between hemodynamic profile of these patient.	https://www.ajog.org/article/S0002-9378(15)01824-4/fulltext	CL016

OBGYN.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
OBGYN	Pregnancy outcomes of massively obese hypertensive gravidas	Chaffin DG Jr, Granger J. The Cabell-Huntington Hospital maternal and neonatal, Virginia, USA.	2015	Conventionally treated hypertensive massively obese gravidas spent more days in the hospital as did their infants, possibly because the incidence of severe preeclampsia was higher (23% vs 6%) than in those whose antihypertensive therapy was hemodynamically directed. In massively obese women with pre-existing hypertension, hemodynamically guided treatment results in fewer cases of severe preeclampsia and fewer maternal and neonatal hospital days.	https://www.sciencedirect.com/science/article/abs/pii/S2210778914003572	CL021
OBGYN	Directed antihypertensive therapy improves growth restriction and perinatal mortality in women with chronic hypertension.	David Chaffin, Jesse Cottrell, Kelly Cummings, David Jude. Maternal Hypertension Center at Cabell Huntington Hospital, Virginia, USA.	Jan-20	Impedance cardiography directed antihypertensive therapy during early pregnancy allows for informed initiation and titration of blood pressure medications. This low cost and non-invasive test should be considered for optimizing outcomes in pregnancies complicated by maternal chronic hypertension.	https://www.ajog.org/article/S0002-9378(19)32206-9/fulltext	CL031
OBGYN	The Hemodynamics of Labor in Women Undergoing Vaginal and Cesarean Deliveries as Determined by Whole Body Bioimpedance	Eran Ashwal, MD Shiri Shinar, MD Sharon Orbach-Zinger, MD Shaul Lev, MD Roi Gat, MD Liron Kedar, MD Yehuda Pauzner, MD Amir Aviram, MD Yariv Yogev, MD Liran Hiersch, MD. Helen Schneider Hospital for Women, Obstetrics and Gynecology, Rabin Medical Center, Petah Tikva, Israel ,Sackler Faculty of .Medicine, Tel Aviv University	Jan-18	Whole body bioimpedance can be used effectively to assess the hemodynamics of vaginal and cesarean deliveries.	https://pubmed.ncbi.nlm.nih.gov/28854446/	CL040

Dialysis.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
Dialysis	Hemodynamic response to fluid removal during hemodialysis: categorization of causes of intradialytic hypotension	Nathan W Levin MD FACP, Marcia H. F. G de Abreu MD, Lucas E. Borges MD, Helcio A. , Tavares Filho Rabia Sarwar, MD Surendra Gupta, MD, Tahir Hafeez MD, Shaul Lev, MD, Caroline Williams, RD, Mount Sinai Icahn School of Medicine NY.	2016	"For the first time online examination of changes in cardiac function and peripheral resistance in relationship to volume removal has been demonstrated in routine dialysis patients utilizing a regional cardiography device. The results of the study of 52 patients over 236 treatments show a clear differentiation of causes for intradialytic hypotension (IDH) can improve our treatment."	https://pubmed.ncbi.nlm.nih.gov/29669016/	CL002
Dialysis	The value of non-invasive measurement of cardiac output and total peripheral resistance to categorize significant changes of intradialytic blood pressure	Yunlin Feng, Yurong Zou, Yifei Zheng, Nathan W. Levin, corresponding author and Li Wang .Mt. Sinai School of Medicine, New .York, NY, USA	2018	Intradialytic non-invasive cardiac output measurement has enabled the assessment of changes in cardiac power and peripheral resistance. These have been demonstrated to be distinctly different causes of hypotensive episodes in routine dialysis patients. This information can potentially improve the care of dialysis patients prone to IDH, by interventions based on specific cause.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6219191/	CL012
Dialysis	Intradialytic exercise increases cardiac power index	, Brent A. Momb ID , Samuel A. E. Headley ID Tracey D. Matthews ID , Michael J. Germain ID. Department of Kinesiology, University of Massachusetts, Amherst, MA, USA.	Dec-19	In conclusion, exercise during dialysis may decrease the likelihood of experiencing ischemic or hypotensive events by enhancing myocardial perfusion through increasing CPI and Q̇	https://www.researchgate.net/publication/339448078_Intradialytic_exercise_increases_cardiac_power_index	CL039

Neonatal.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
Neonatal	Assessing Patent Ductus Arteriosus (PDA) Significance on Cardiac Output by Whole-Body Bio-impedance	Ruth Rafaeli Rabin · Ilya Rosin · Avraham Matitiau · Yael Simpson · Orna Flidel-Rimon. Department of Neonatology, Kaplan Medical Center, Israel.	2020	We found significant differences in hemodynamic parameters between premature infants with and without significant PDAs. We believe these changes can aid in the diagnosis of large PDAs and in the decision to start treatment. The NICaS® device can provide a quick and simple bedside assessment, and together with an echocardiogram, can improve our treatment.	https://pubmed.ncbi.nlm.nih.gov/32524206/	CL003
Validation/ Neonatal	Continuous non-invasive measurement of stroke volume and cardiac index in infants and children: comparison of Impedance Cardiography NICaS® vs CardioQ® method	R Beck, L Milella, C Labellarte. Bari Hospital, Pediatric Dpt. , Italy	Jun-18	Good correlation was observed in pediatric patients for CI measured with NICaS® in comparison with CardioQ® device. Continuous non-invasive monitoring of NI-CI can be particularly interesting for the pediatric population.	https://pubmed.ncbi.nlm.nih.gov/29938742/	CL029
Neonatal	Neonatal and Pediatric General and Cardiac Anaesthesia and ICU	Leonardo Milella, Director and Head, General Neonatal and Pediatric Anesthesia and Intensive Care Unit--Neonatal. Anesthesia and Intensive Care Unit, Pediatric Hospital "Giovanni XXIII", Italy	Jan-18	We noticed that there was a good relation between the comparative data: these first results have been already presented. Soon after, we studied 41 neonatal and pediatric patients who had undergone cardiac surgery, urological surgery, orthopedic surgery and general surgery, and we compared the two systems data: Cardiac Output. Heart Rate, Cardiac Index, Stroke Volume, Total Peripheral Resistance Index, Total body Water, Cardiac Power Index. The statistical and clinical were absolutely satisfactory and the algorithm has been validated.	https://medcraveonline.com/JPNC/neonatal-and-pediatric-general-and-cardiac-anaesthesia-and-icu-what39s-new-in-20172018--bari-pediatric-hospital-experience-italy.html	CL037

infectious diseases.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
Infectious diseases/ Validation	The role of noninvasive hemodynamic monitoring in the evaluation of acute and severe pesticide poisoning	Gao Xun, Chen Mingli, Wang Yufeng, Zhu Qianqian, Zhu Baoyue, Wang PuKong Fantuo, Wang Weizhan	Dec-20	NICaS can effectively monitor the hemodynamic indexes of patients with acute pesticide poisoning.	https://europepmc.org/article/med/33406543	CL035

Pharma.

Topic	Title	Authors + Research site	Year	Abstract	Research Link	Catalogue №
Cardiology/ Pharma	A Phase 2a dose-escalation study of the safety, tolerability, pharmacokinetics and hemodynamic effects of BMS-986231 in hospitalized patients with heart failure with reduced ejection fraction	Cristina Tita, Edward M Gilbert, Adrian B Van Bakel, Jacek Grzybowski, Garrie J Haas, Mohammad Jarrah, Stephanie H Dunlap, Stephen S Gottlieb, Marc Klapholz, Parag C Patel, Roman Pfister, Tim Seidler, Keyur B Shah, Tomasz Zieliński , Robert P Venuti , Douglas Cowart, Shi Yin Foo, Alexander .Vishnevsky, Veselin Mitrovic	Oct-17	BMS-986231 demonstrated a favorable safety and hemodynamic profile in patients hospitalized with advanced heart failure. Based on preclinical data and these study's findings, it is possible that the hemodynamic benefits may be mediated by inotropic and/or lusitropic as well as vasodilatory effects.	https://pubmed.ncbi.nlm.nih.gov/28677877/	CL030

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