

**UCC Library and UCC researchers have made this item openly available.
Please [let us know](#) how this has helped you. Thanks!**

Title	International expert consensus on a scientific approach to training novice cardiac resynchronization therapy implanters using performance quality metrics
Author(s)	Mascheroni, Jorio; Mont, Lluís; Stockburger, Martin; Patwala, Ashish; Retzlaff, Hartwig; Gallagher, Anthony G.; Alonso, Christine; Binner, Ludwig; Bongiorno, Maria Grazia; Infante, Ernesto Diaz; Gadler, Fredrik; Gras, Daniel; Margitfalvi, Peter; Moreno, Javier; Paratsii, Oleksii; Rao, Archana; Schäfer, Harald; van Kraaij, Dave
Publication date	2019-04-12
Original citation	Mascheroni, J., et al. (2019) 'International expert consensus on a scientific approach to training novice cardiac resynchronization therapy implanters using performance quality metrics', International Journal of Cardiology. doi: 10.1016/j.ijcard.2019.04.036
Type of publication	Article (peer-reviewed)
Link to publisher's version	http://www.sciencedirect.com/science/article/pii/S016752731930703X http://dx.doi.org/10.1016/j.ijcard.2019.04.036 Access to the full text of the published version may require a subscription.
Rights	© 2019, Elsevier B.V. All rights reserved. This manuscript version is made available under the CC BY-NC-ND 4.0 license. https://creativecommons.org/licenses/by-nc-nd/4.0/
Embargo information	Access to this article is restricted until 12 months after publication by request of the publisher.
Embargo lift date	2020-04-12
Item downloaded from	http://hdl.handle.net/10468/7863

Downloaded on 2021-11-29T18:23:17Z

Supplementary Table S1. CRT Implanters and countries represented in the Delphi panel.

Country	Number of CRT Implanters	Names
France	2	C. Alonso, D. Gras
Germany	3	L. Binner, H. Schäfer, M. Stockburger
Italy	1	M.G. Bongiorni
Netherlands	1	D. van Kraaij
Slovakia	1	P. Margitfalvi
Spain	3	E. Diaz Infante, L. Mont, J. Moreno
Sweden	1	F. Gadler
Ukraine	1	O. Paratsii
UK	2	A. Patwala, A. Rao
Total	15	

Supplementary Table S2. Summary of the changes agreed and voted on by the Delphi panel to the procedure steps, errors and critical errors of the reference approach to cardiac resynchronization therapy implantation.

Procedure phase	STEPS			ERRORS			CRITICAL ERRORS		
	Before	After	Changes applied	Before	After	Changes applied	Before	After	Changes applied
I	8	8	0	7	7	0	1	1	0
II	6	6	3	4	4	1	0	2	2
III	4	4	1	4	4	1	4	5	1
IV	25	25	4	19	19	1	8	9	3
V	19	19	2	14	14	2	4	4	0
VI	24	24	6	7	7	2	5	6	2
VII	23	21	7	13	14	8	2	2	0
VIII	8	8	2	6	6	2	1	1	1
IX	28	28	2	20	20	0	6	6	2
X	26	25	2	17	17	2	4	4	1
XI	8	8	1	5	4	2	6	6	0
XII	12	11	2	2	1	1	8	8	1
XIII	5	7	2	4	5	1	1	2	1
N = 13	196	194	34	122	122	23	50	56	14

Supplementary Table S3. Examples of changes applied to the metrics by the Delphi panel at the consensus meeting in Amsterdam. Modifications are highlighted in italic.

Procedure Phase	Type of change	Status BEFORE Delphi	Status AFTER Delphi	Consensus
II & III	Extra critical error added		<i>Failure to secure guidewires</i>	100%
III	Definition modification	Puncture with Seldinger needle <i>at medial border of pectoralis minor muscle</i> (under fluoroscopy)	Puncture with Seldinger needle under fluoroscopy	100%
IV	Extra critical error added		<i>Failure to detect that lead is entrapped and continue pushing</i>	100%
VI	Extra critical error added		<i>Failure to stop contrast injection in the presence of dissection</i>	100%
VII	Definition modification	Insert the <i>proximal</i> end of the guidewire through the LV lead <i>tip seal</i> using the guidewire insertion tool	Insert the <i>soft</i> end of the guidewire through the LV lead <i>connector</i> using the guidewire insertion tool	100%
VII	Extra error added		<i>Gloves are dirty when shaping the stylet</i>	100%
VIII	Definition modification	<i>Confirm NO</i> phrenic nerve stimulation at 10V @0.5ms <i>using pacing vector with threshold <3.0V @0.5ms</i>	<i>Test</i> phrenic nerve stimulation at 10V @0.5ms	100%
VIII	Extra error deleted	<i>Accept LV pacing vector with Q-LV is <90ms without assessing other available pacing vectors</i>		100%
VIII	Extra error added		<i>Accept LV lead position with phrenic nerve stimulation present when another pacing vector or target vein is available</i>	100%
X	Definition modification	<i>Remove the guidewire from LV lead. Insert the straight stylet into the lead up to the mid-coronary sinus</i>	<i>Retract the guidewire into mid CS or replace it with stylet, depending on manufacturer</i>	100%
X	Extra error modification	Remove guide catheter before implanting the RV lead	Remove guide catheter before implanting the RV <i>and RA</i> lead	100%
X	Extra error added		<i>Failure to take measures to prevent air embolism with LV lead in 9F introducer</i>	100%
XII	Definition modification	Verify device biventricular pacing functioning on ECG monitor	<i>Reconfirm lead electricals with device in pocket and verify device biventricular pacing functioning on ECG monitor</i>	100%
XIII	Extra step and critical error added		<i>Confirm swab and suture count is correct</i>	100%