







Definition

Wording to use

Class I

Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.

Is recommended or is indicated

Class II

Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.

Class IIa

Weight of evidence/opinion is in favour of usefulness/efficacy.

Should be considered

Class IIb

Usefulness/efficacy is less well established by evidence/opinion.

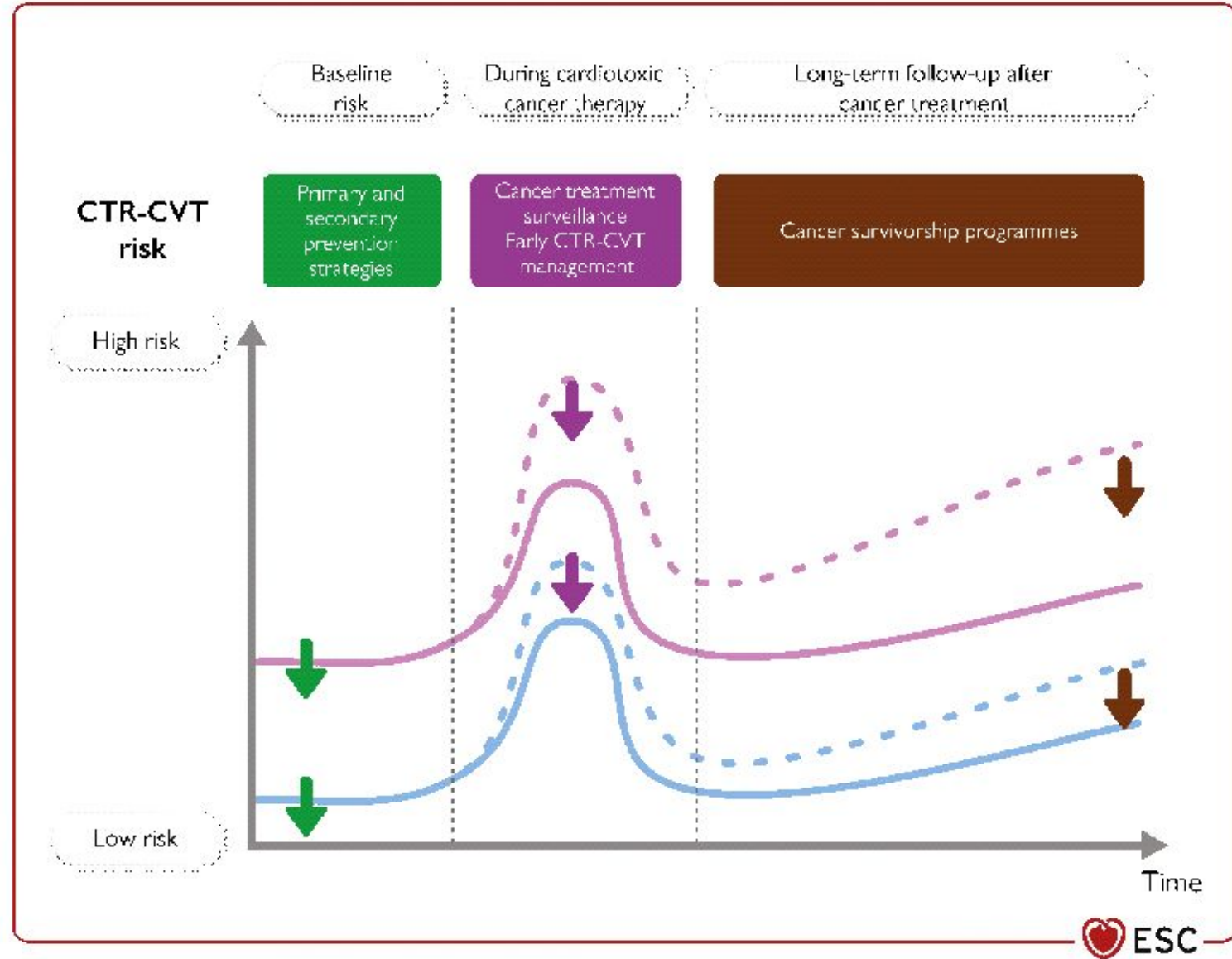
May be considered

Class III

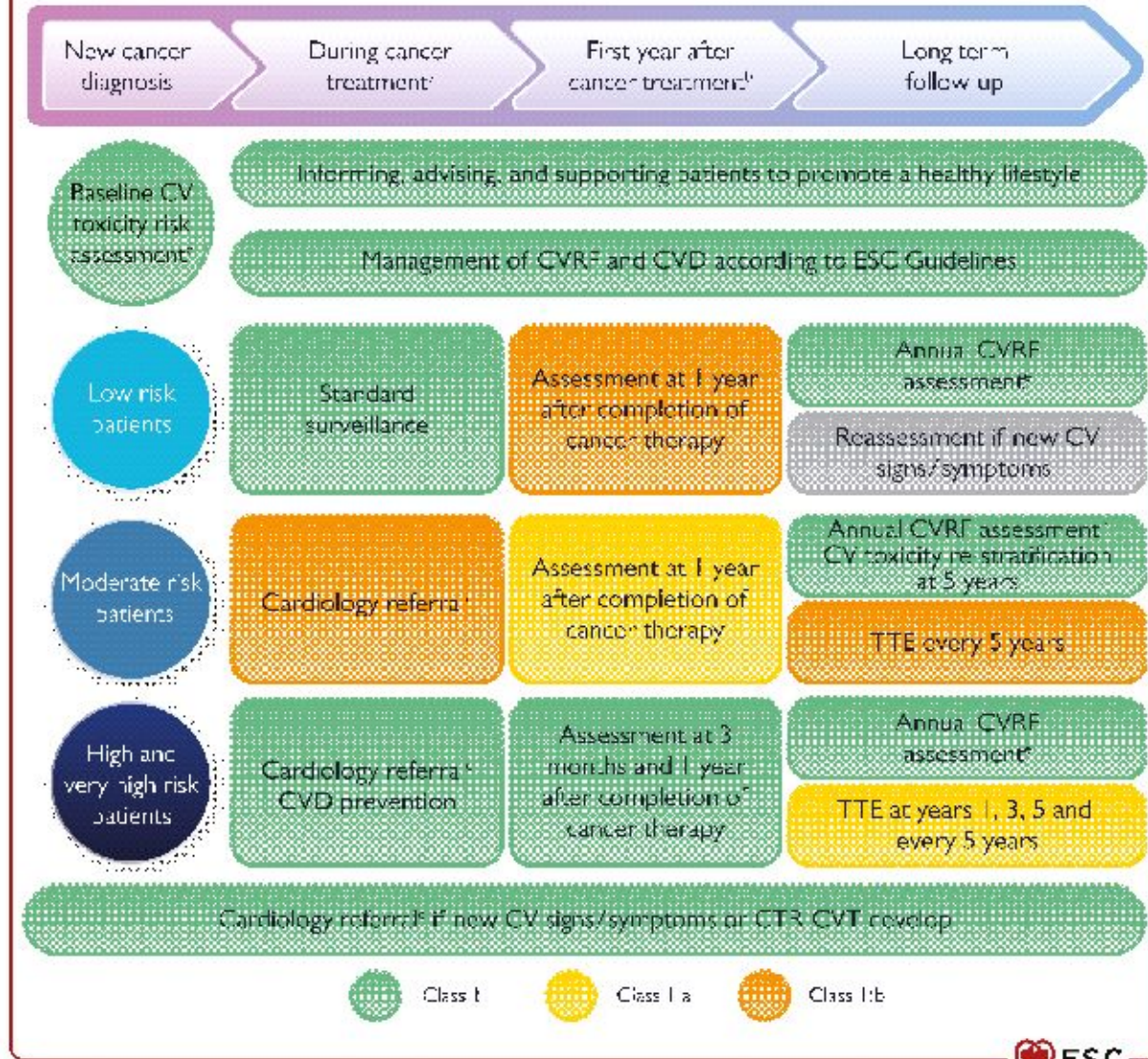
Evidence or general agreement that the given treatment or procedure is not useful/effective, and in some cases may be harmful.

Is not recommended

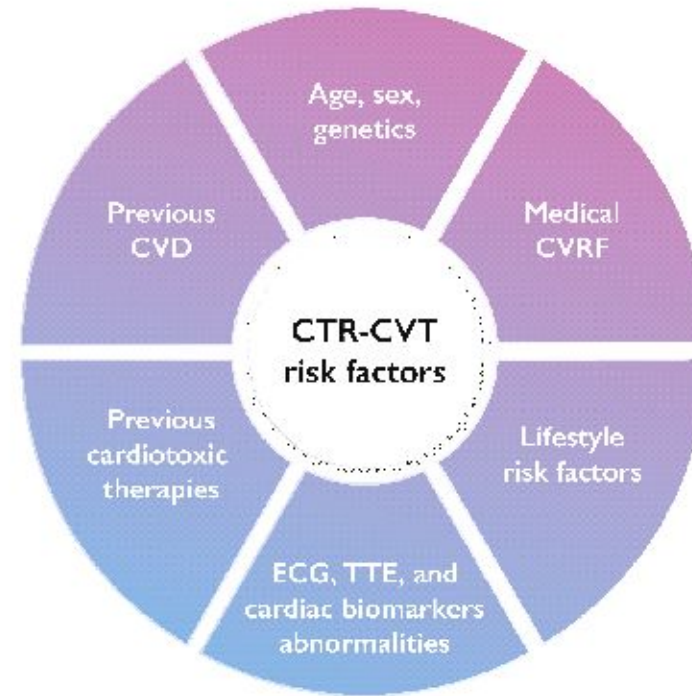
Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.



Cardio-Oncology Care Pathways



Baseline CV toxicity risk assessment checklist

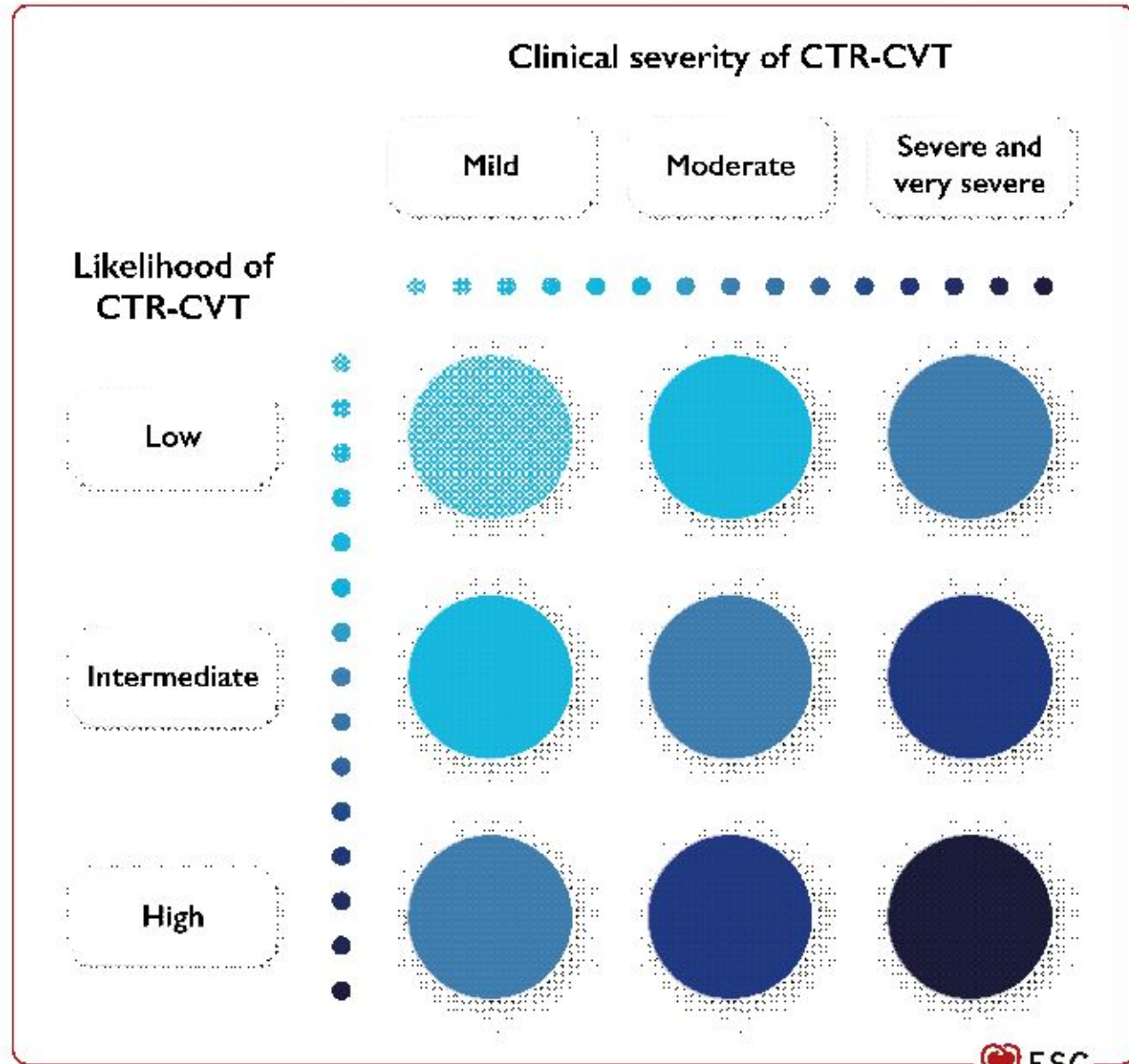


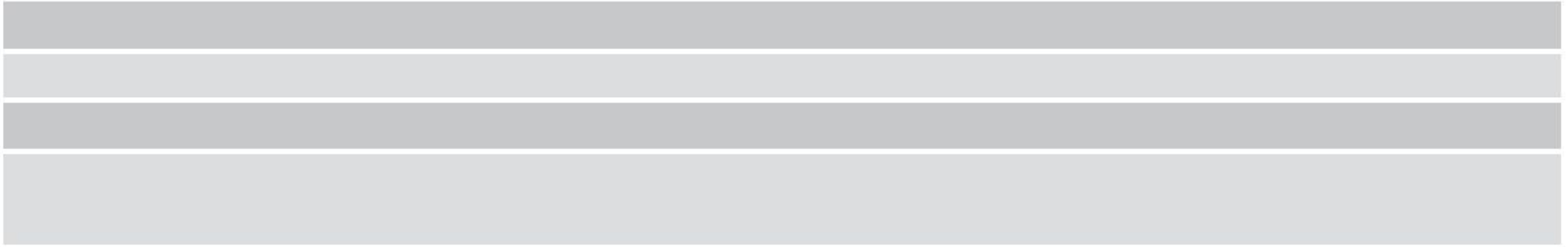
Clinical assessment

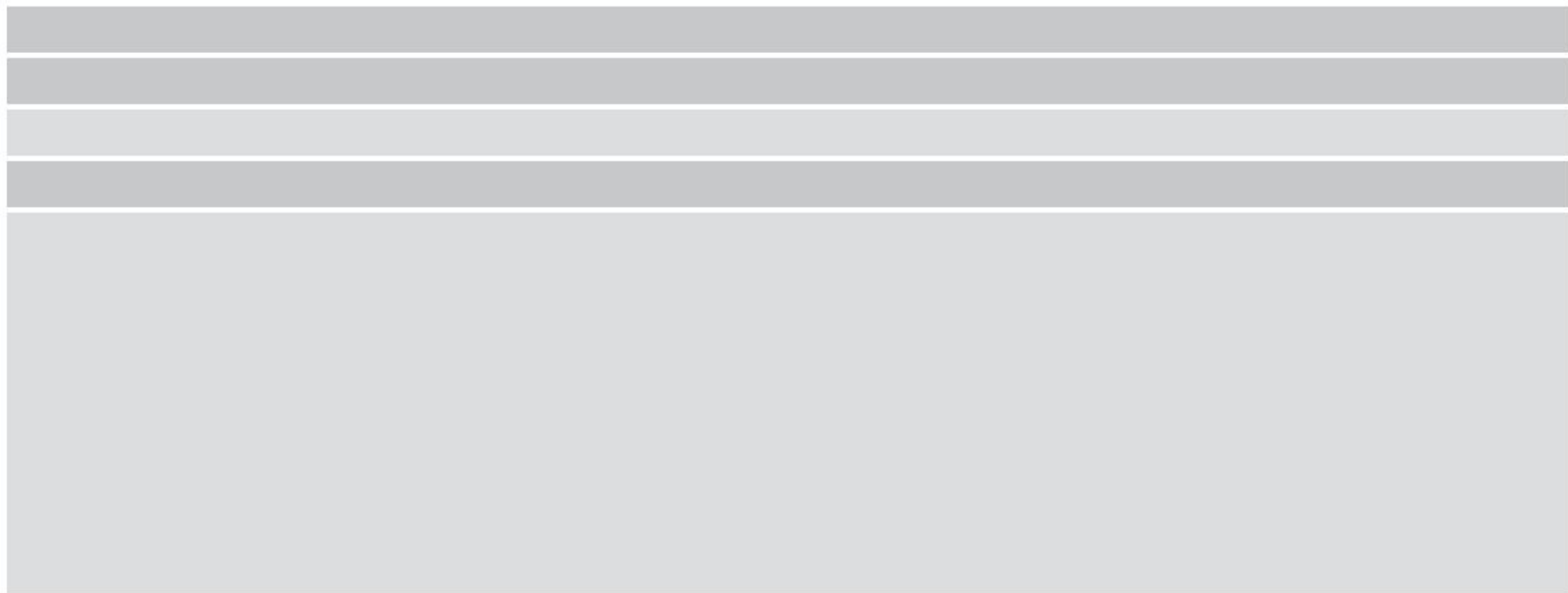
- Cancer treatment history
- CV history
- CVRF
- Physical examination
- Vital signs measurement^a

Complementary tests

- BNP or NT-proBNP^b
- cTn^c
- ECG
- Fasting plasma glucose / HbA1c
- Kidney function / eGFR
- Lipid profile
- TTE^d





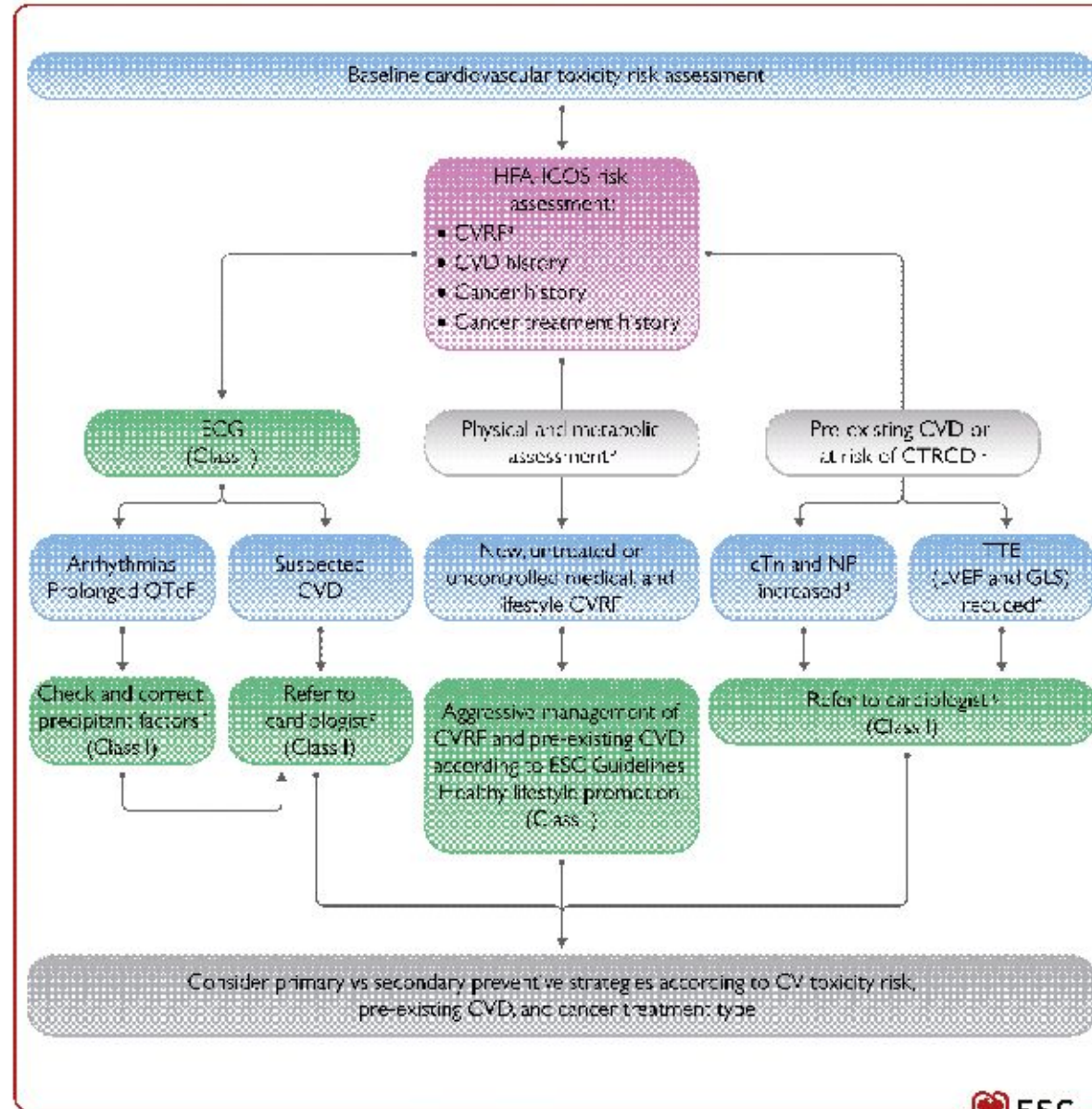


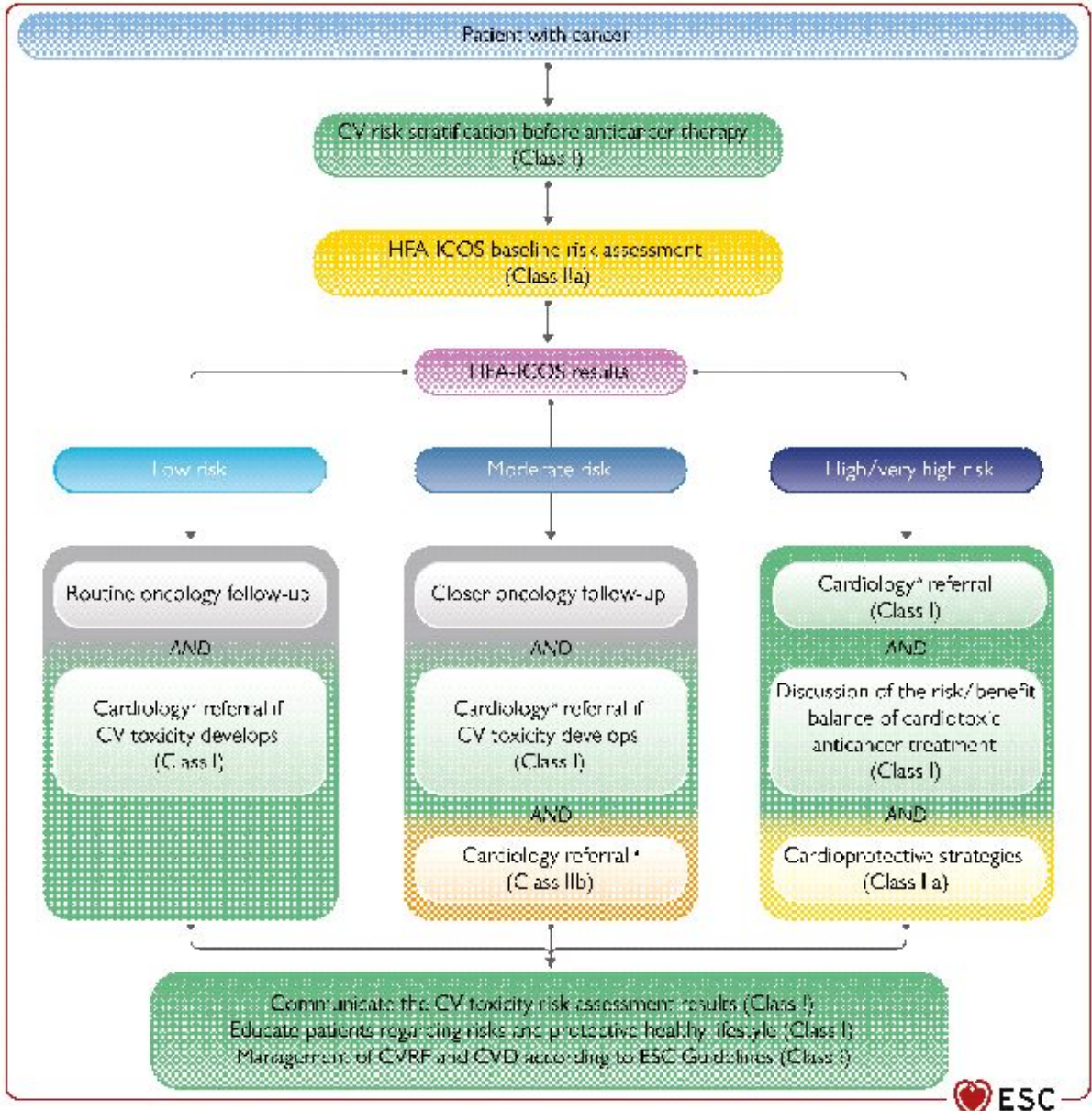












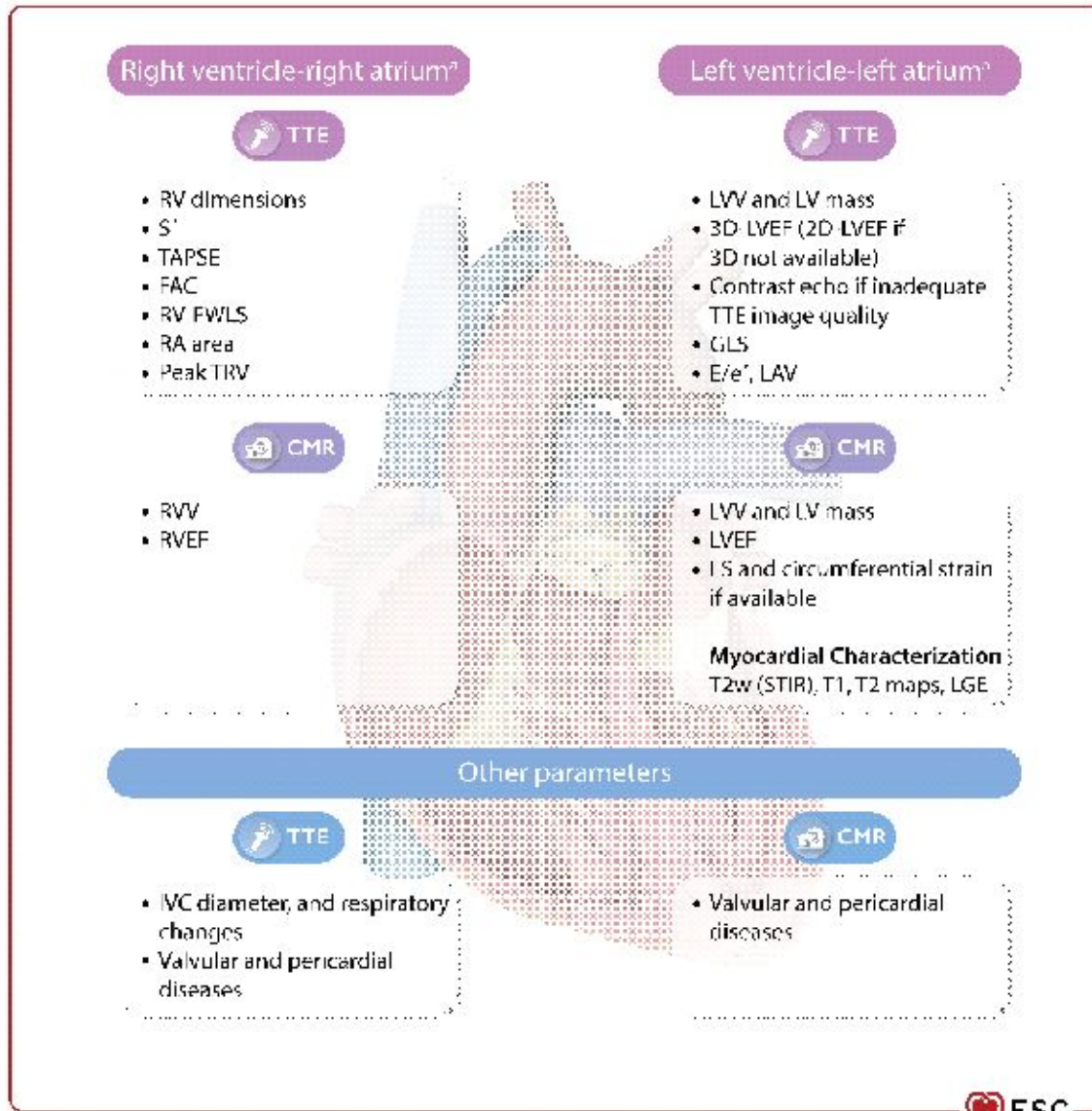
	Green	Blue
	Green	Light Blue
	Yellow	Light Blue
	Green	Light Blue

Baseline clinical CV assessment (physical exam and ECG) is recommended in all cancer patients scheduled for cytotoxic therapies.

	Patient risk level	TTE ¹	NP	cTn
Antiarrhythmics	Very high risk Moderate risk	Class I	Class II	Class II
HER2-targeted therapies ²	Very high risk Moderate risk	Class I	Class II	Class II
Fluoropyrimidines	Other conditions	Class I		
VEGF	Very high risk Moderate risk Low risk	Class I Class II Class II	Class II	Class II
Second- and third-generation BCR-ABL1 KI	Other conditions	Class II		
BTK inhibitors	Very high risk	Class I		
PI3K	Very high risk Moderate risk Low risk	Class I Class I Class I	Class II	
RAF and MEK inhibitors	Very high risk Moderate risk Low risk	Class I Class I Class I		
ICI	Very high risk Other conditions	Class I Class II	Class I	Class I
Quinercetin	Other conditions	Class I		
CAK1 and III	Previous CVD Other conditions	Class I Class II	Class I	Class I
→ to a volume including the heart	Previous CVD	Class II		
TSCT	Other conditions	Class I	Class II	

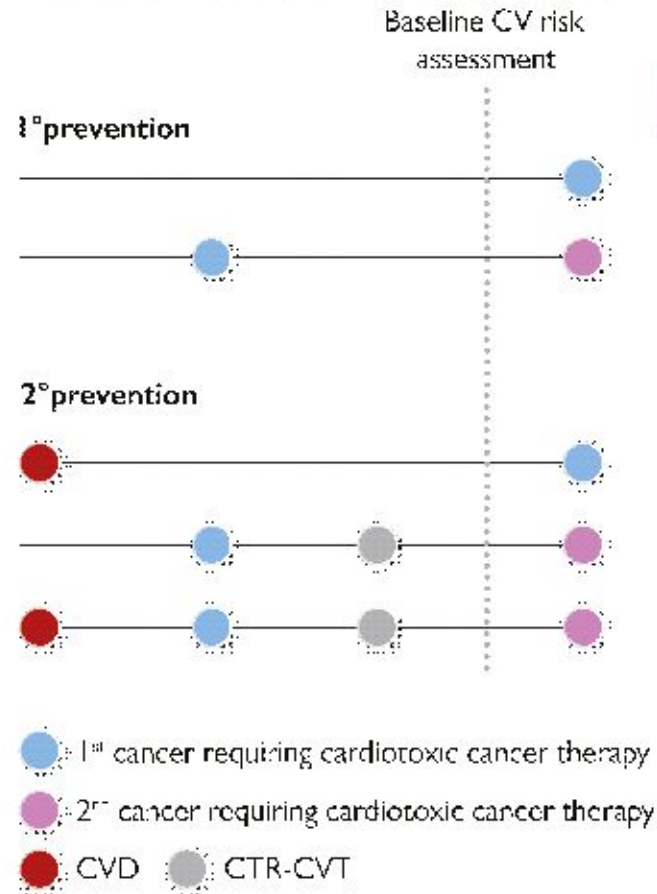
Very high risk
 Moderate risk
 Low risk
 Other conditions
 Class I
 Class II
 Class III





Primary and secondary cancer-therapy related CV toxicity prevention strategies

Primary vs secondary prevention



Management of CVD and CVRF according to ESC Guidelines



In patients at high and very high risk of CTRCD

Minimize the use of cardiotoxic drugs

ACE-I/ARB and beta-blockers

Dexrazoxane/liposomal anthracyclines (patients treated with anthracyclines)

Statins



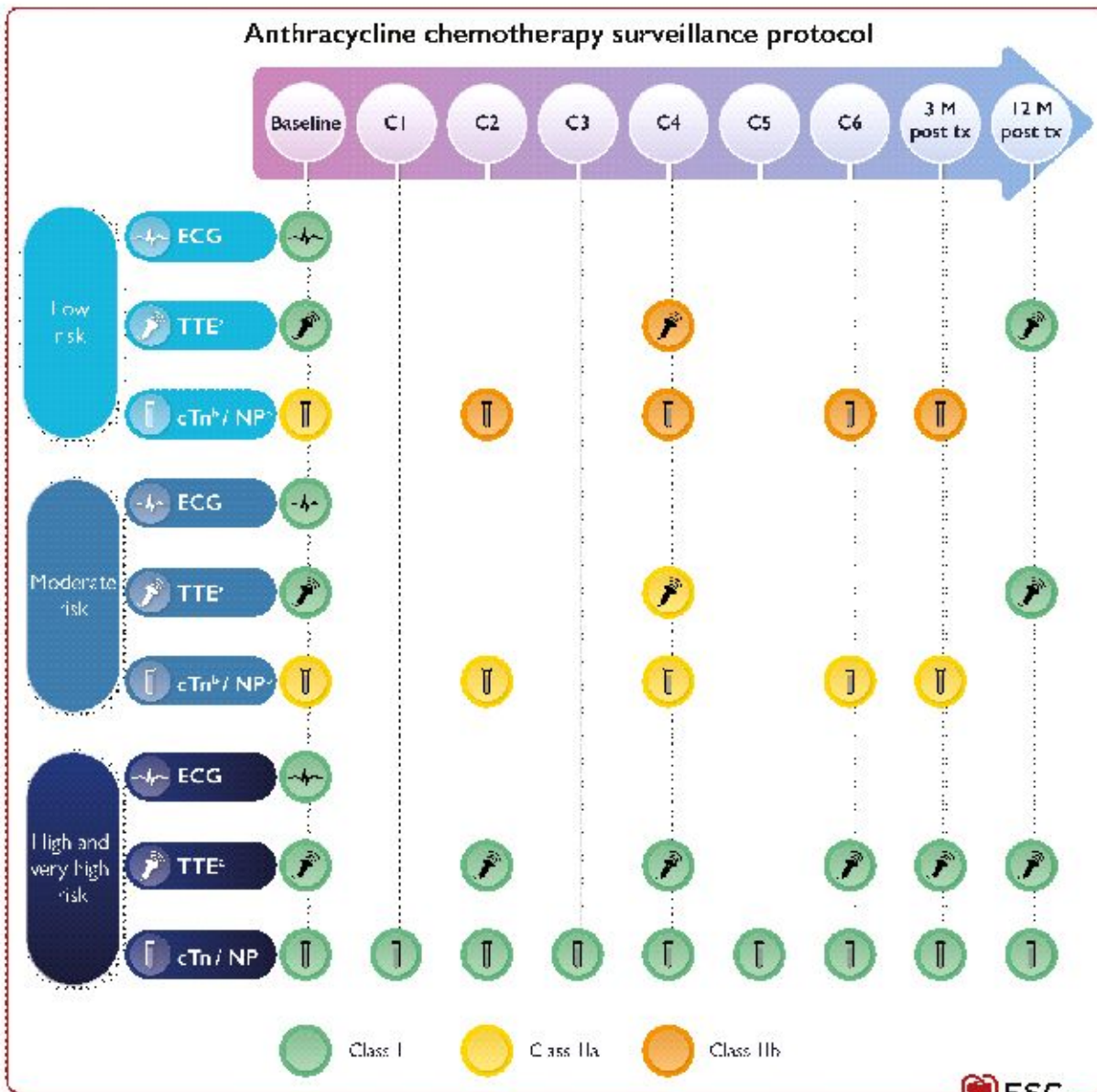
Class I



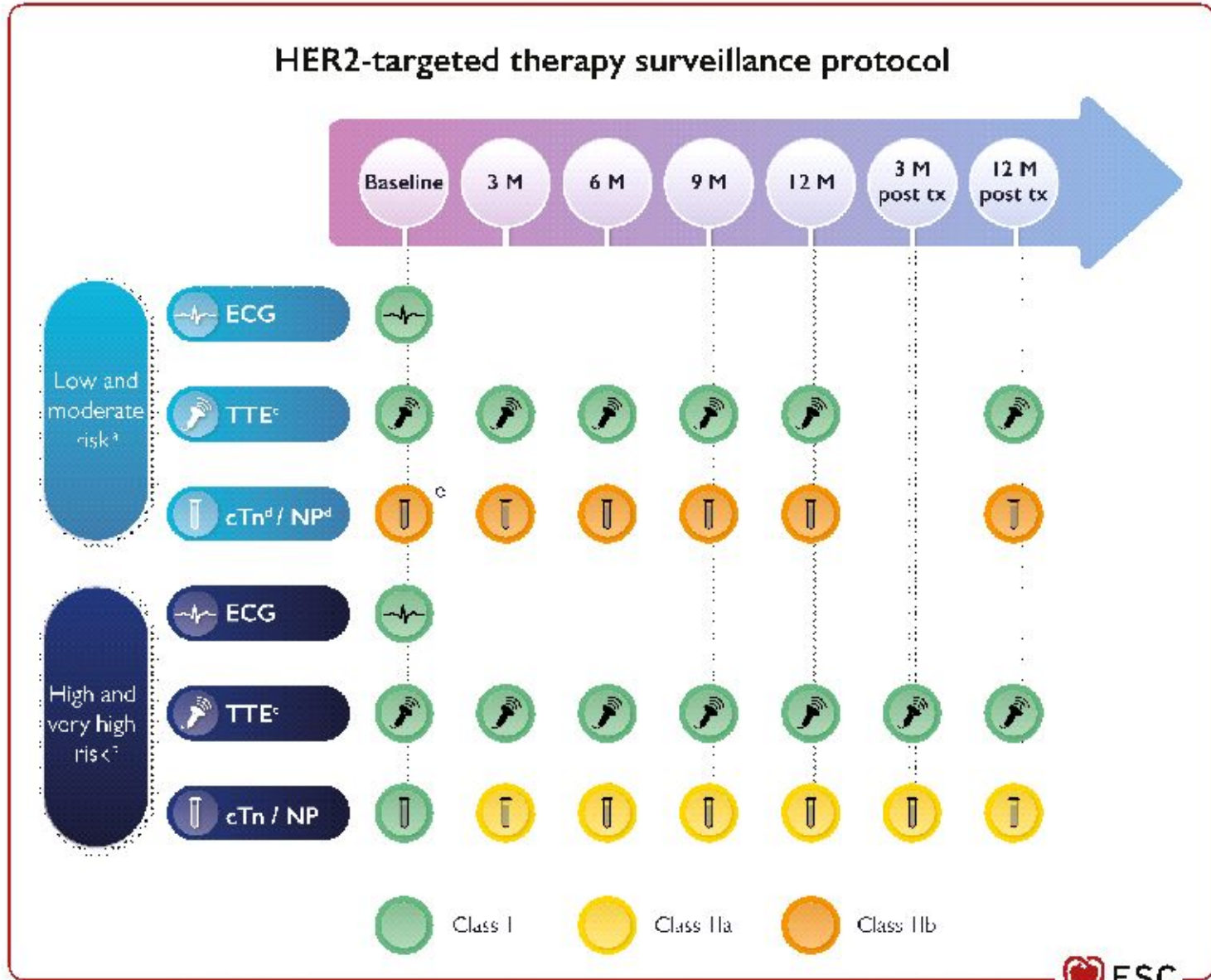
Class IIa



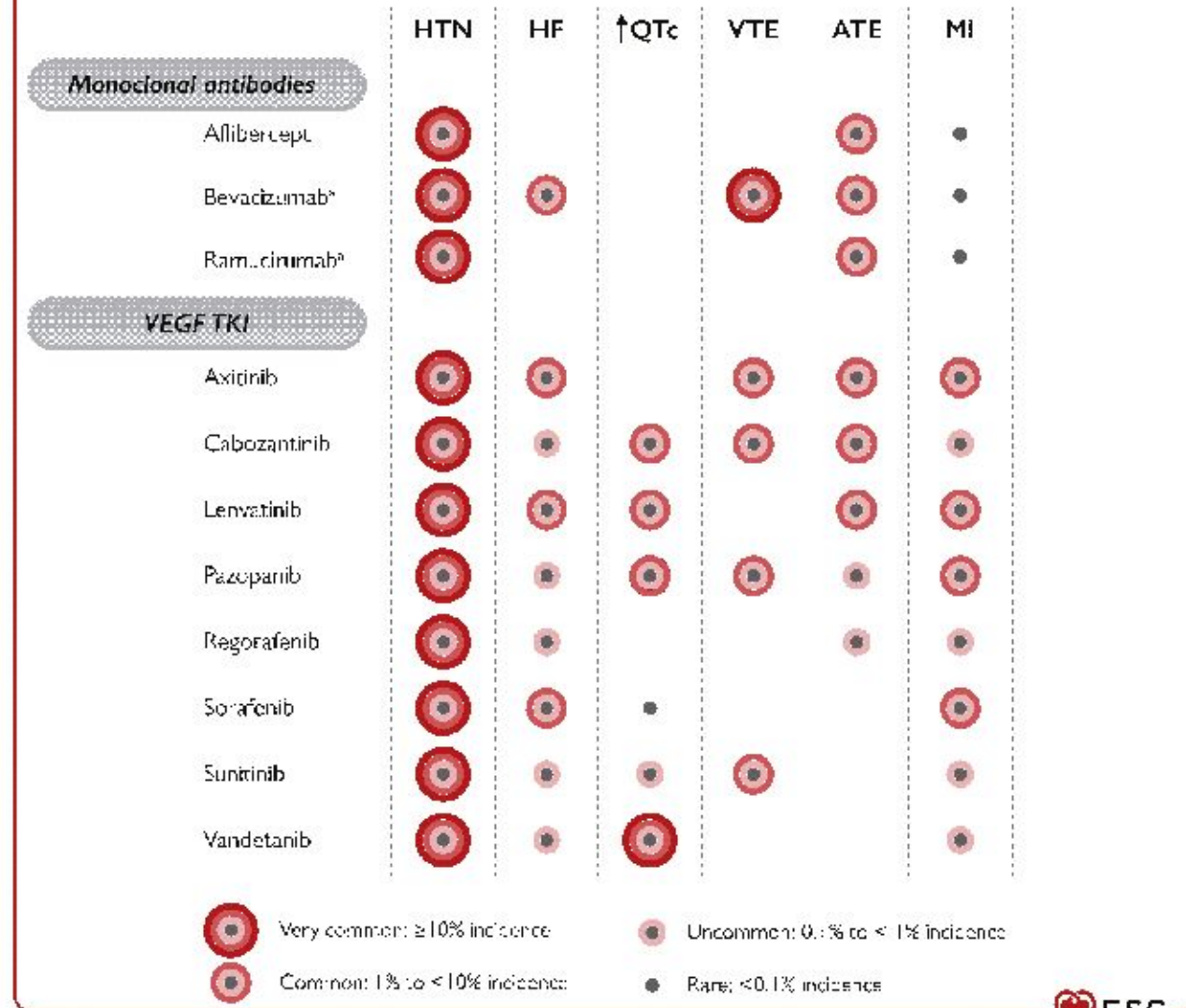
Anthracycline chemotherapy surveillance protocol



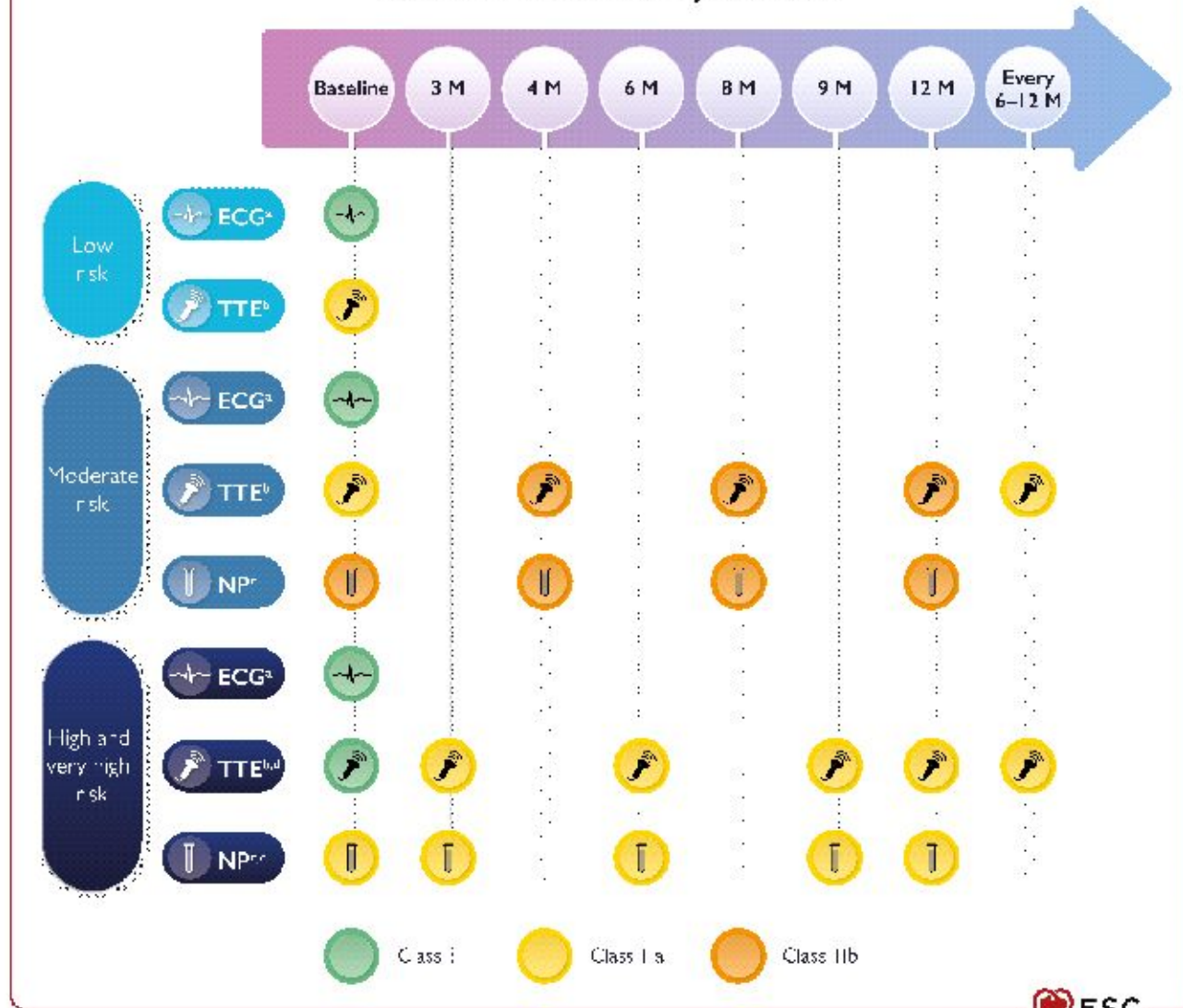
HER2-targeted therapy surveillance protocol



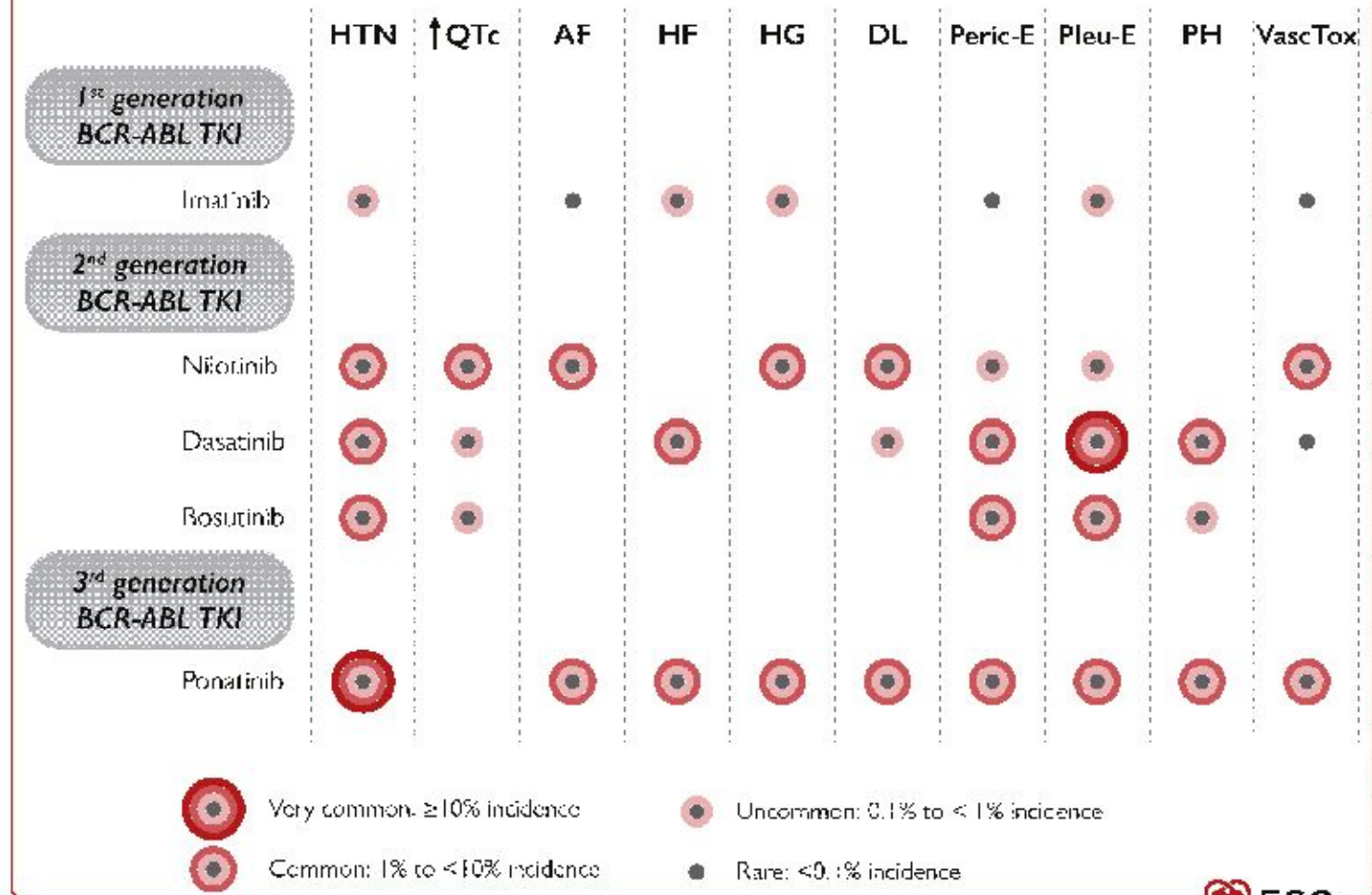
VEGFi-related cardiovascular toxicities



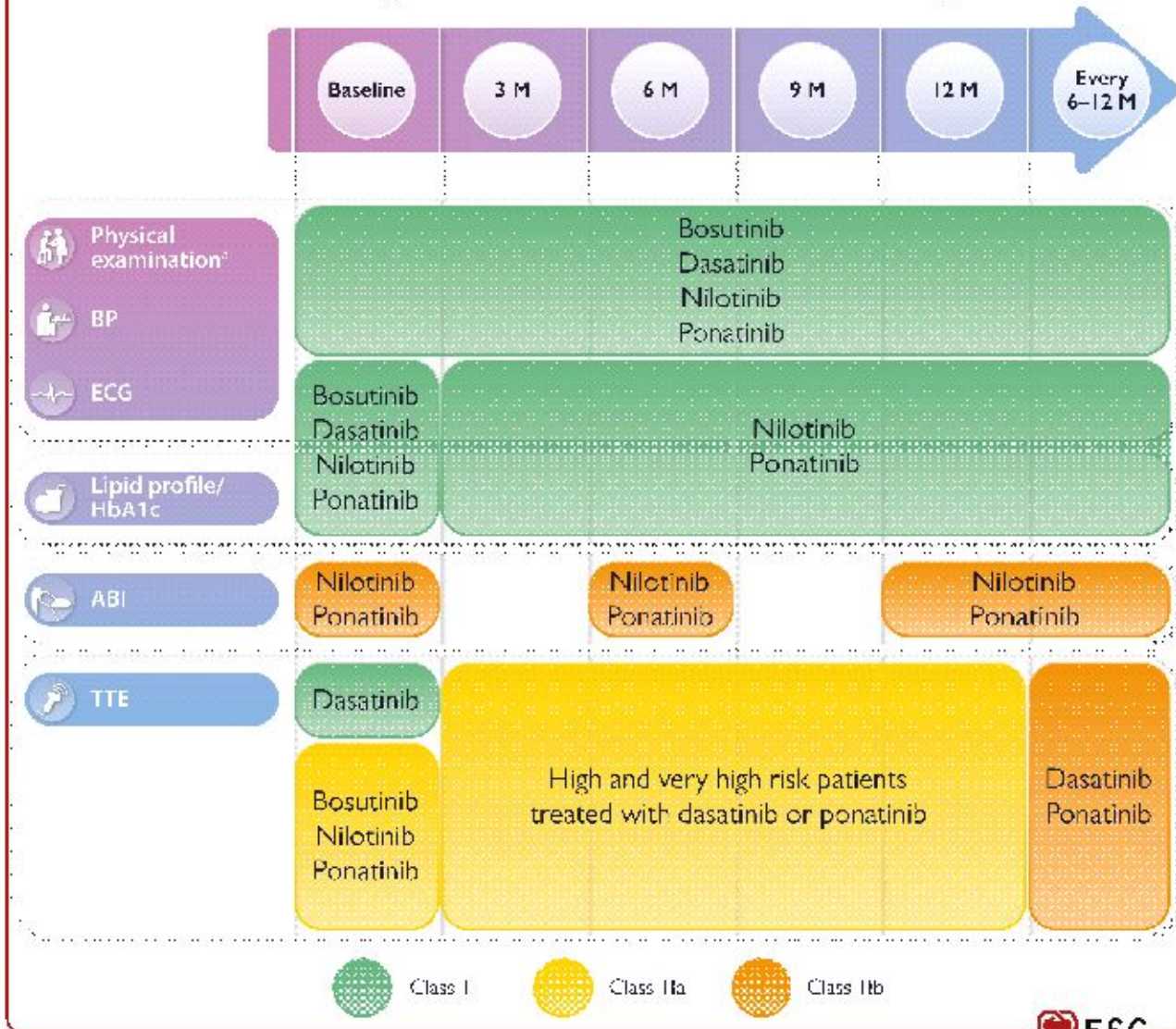
VEGFi surveillance protocol



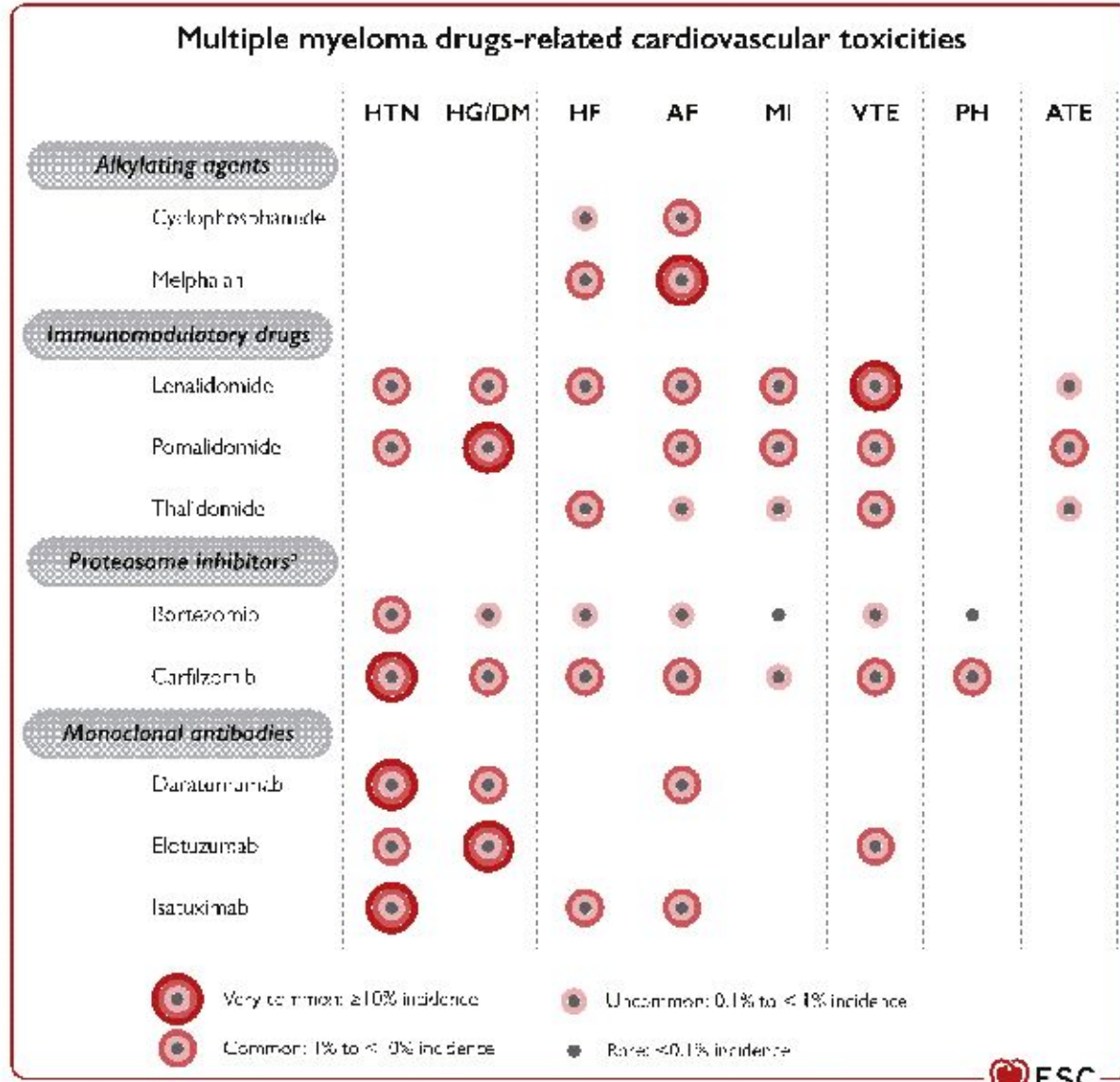
BCR-ABL TKI-related cardiovascular toxicities



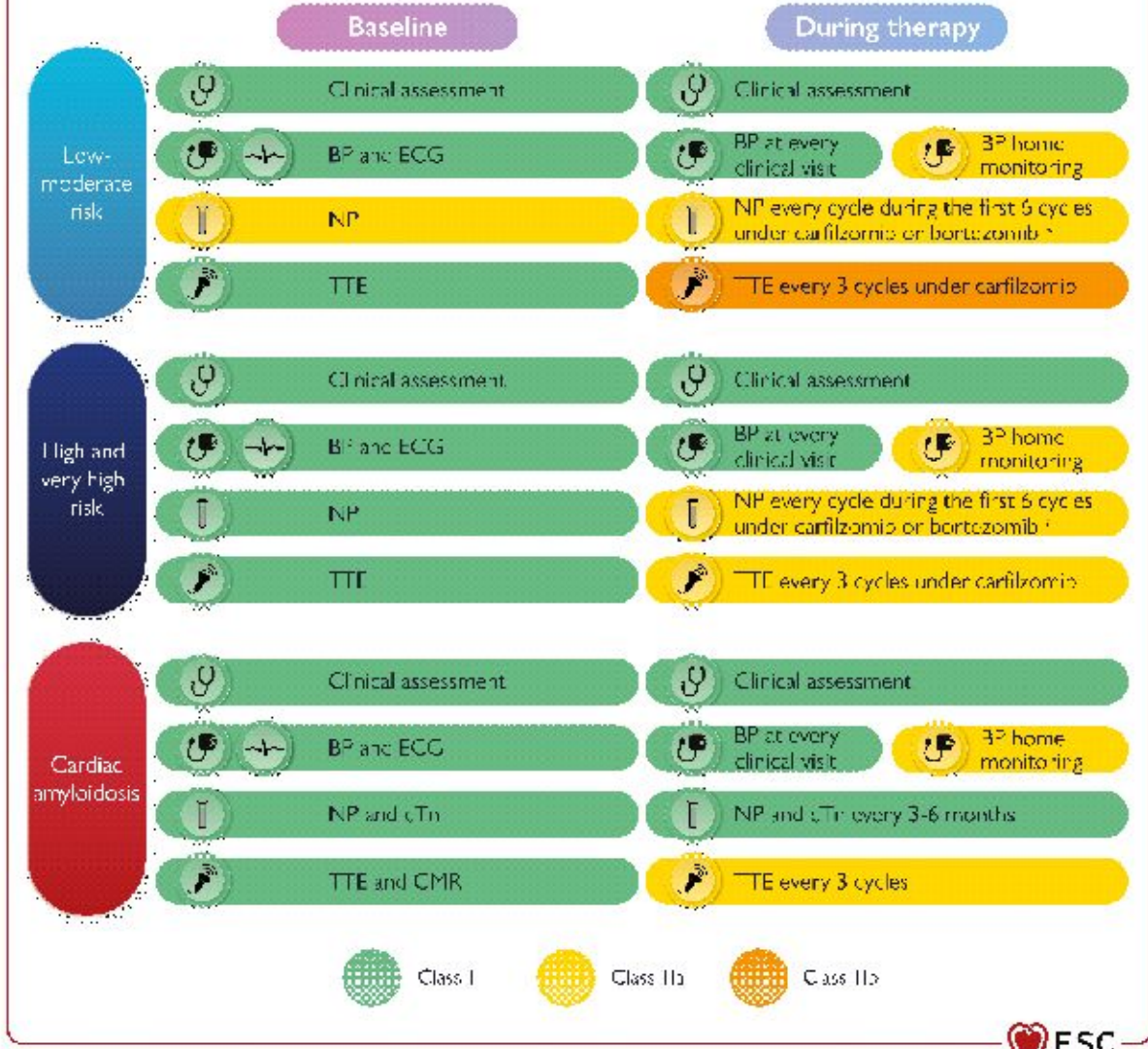
Second and third generation BCR-ABL TKI surveillance protocol



	Yellow	Light Blue
	Green	Light Blue
	Yellow	Light Blue
	Orange	Light Blue
	Orange	Light Blue



Proteasome inhibitors surveillance protocol



Risk factors for venous thromboembolic events in patients with multiple myeloma

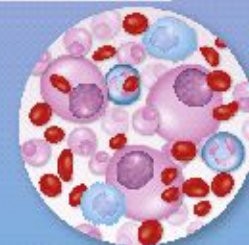
Patient-related risk factors

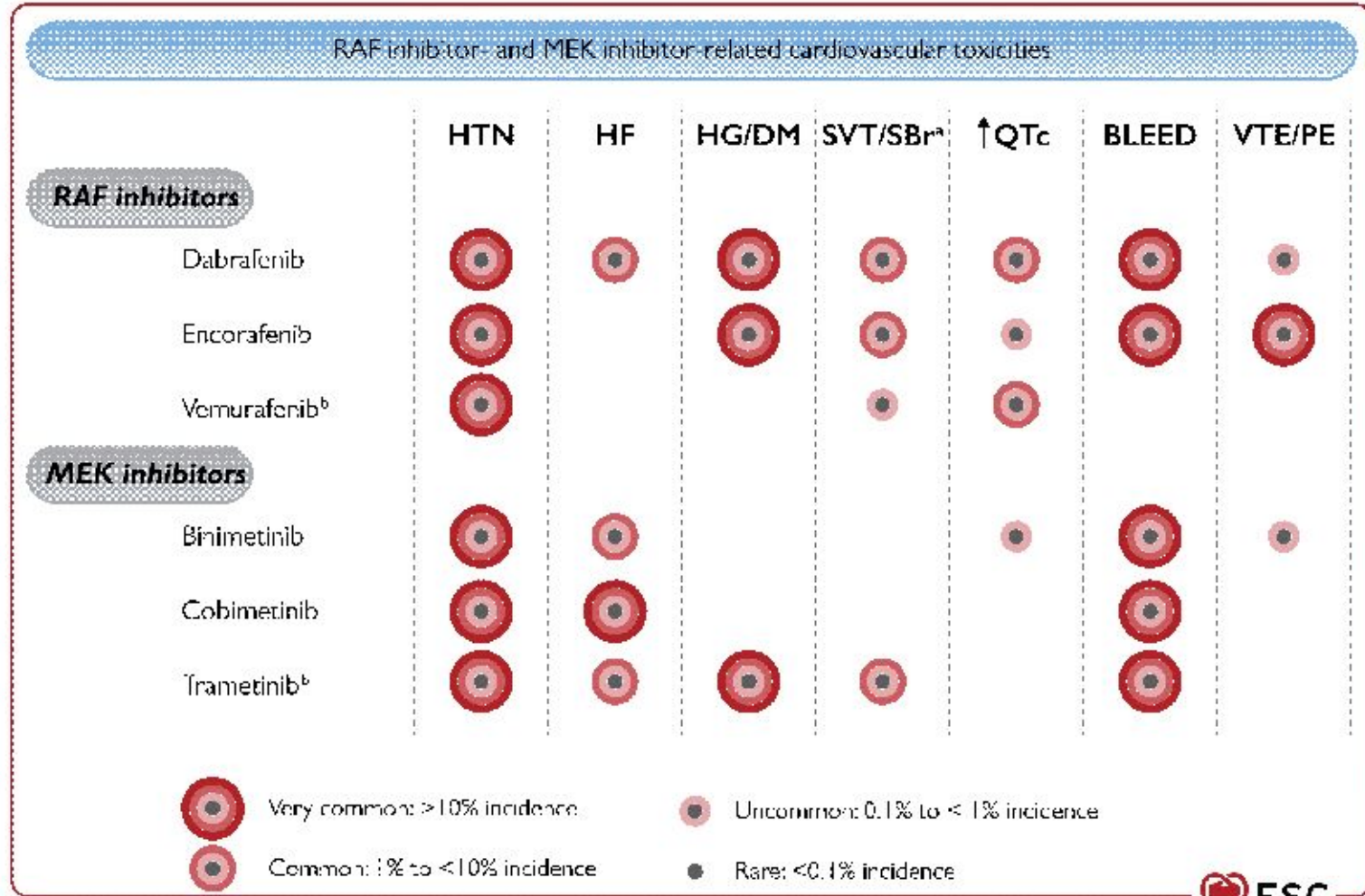
- Previous VTE
- Acute infections
- Autoimmune disease
- Central venous catheter
- Chronic renal disease
- Cigarette smoking
- CVD
- DM
- General surgery
- History of inherited thrombophilia
- Immobilization, surgery, trauma
- Obesity (BMI >30 kg/m²)



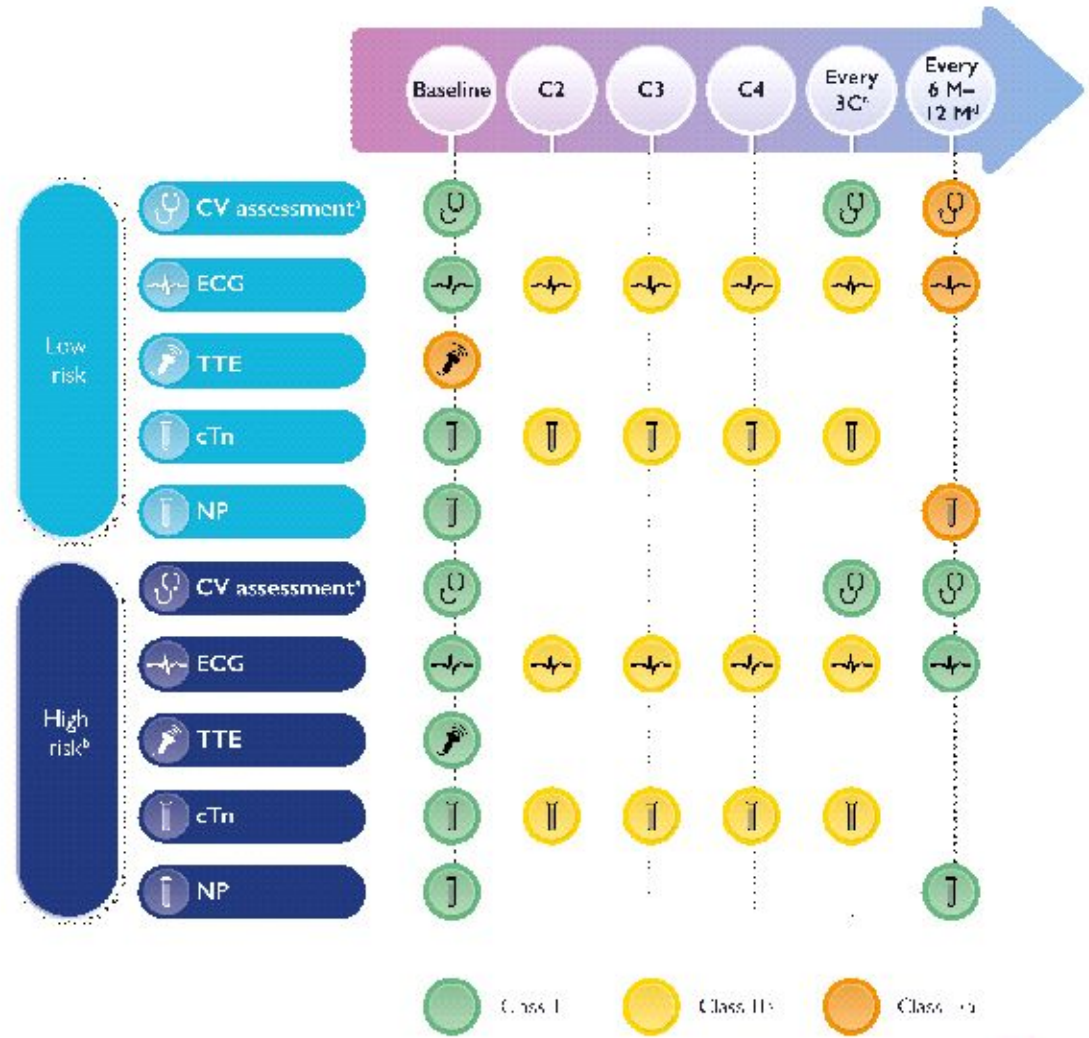
Myeloma-related risk factors

- Advanced disease status
- Erythropoietin-stimulating agents
- High dexamethasone doses
- Hyper-viscosity state
- Thalidomide/lenalidomide/ponalidomide









Immune checkpoint inhibitors surveillance protocol




Androgen deprivation therapy-related cardiovascular toxicities

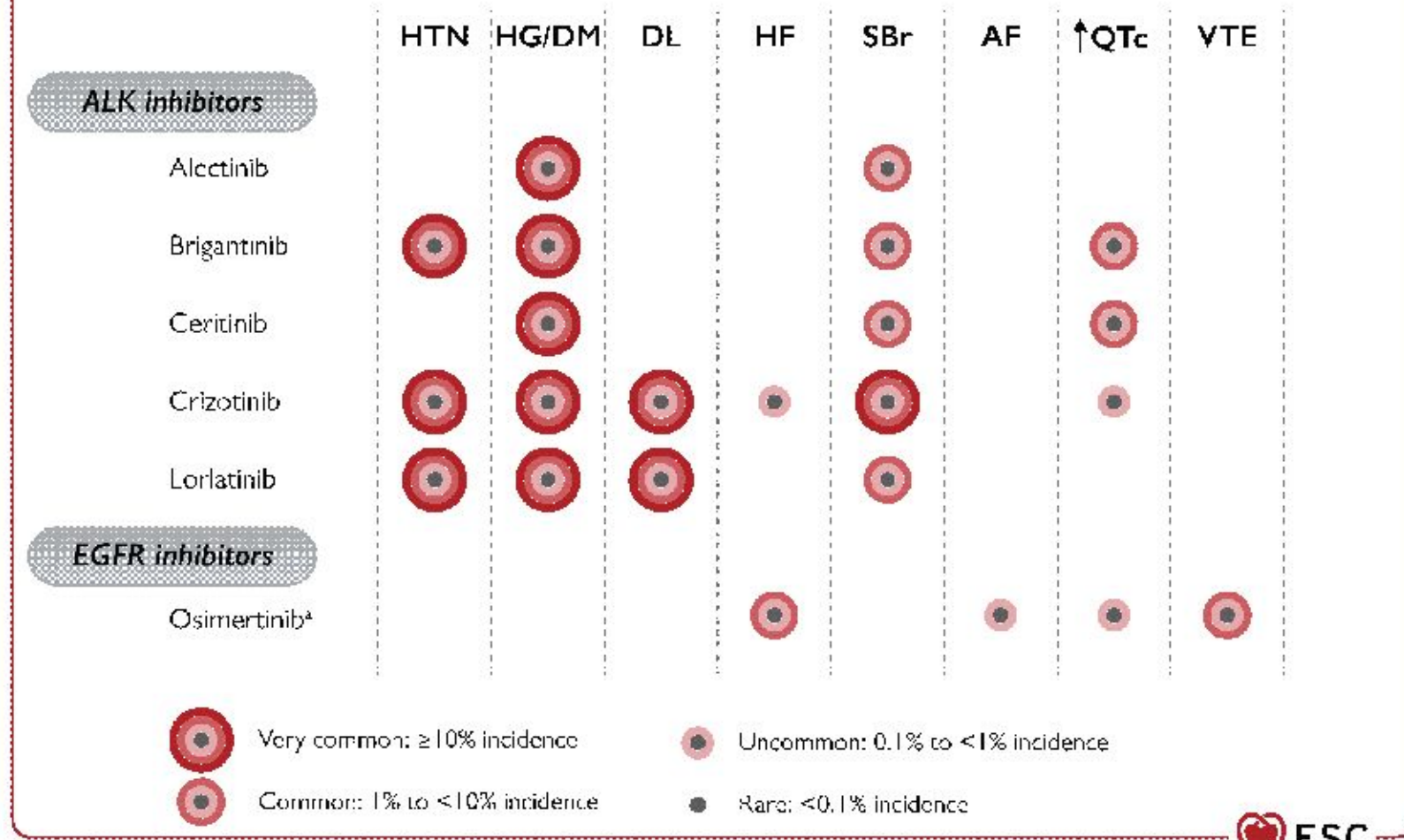
	HTN	HG/DM	HF	IHD/MI	AF	↑QTc
GnRH agonist						
Goserelin	•	⊙	⊙	⊙		•
Fistralin		⊙				•
Leuprolerin	•					•
Triptorelin	⊙	•				•
GnRH antagonist						
Egarect	•	•	•	•	•	•
Kelugon		⊙	•	•		•
1st generation antiandrogens						
Firaparantol	⊙	⊙	⊙	⊙		•
Flutamide	•					•
Nitrofurantoin	⊙	⊙	⊙	⊙		•
2nd generation androgen deprivation therapy						
Apalutamide	⊙	⊙	⊙	⊙		•
Enzalutamide	•		⊙	⊙		•
Ertuzumab	⊙			⊙		•
Androgen metabolism inhibitor						
Abiraterone	⊙	⊙	⊙	⊙	⊙	•

 Very common: ≥ 10% incidence
  Common: > 1% to < 10% incidence

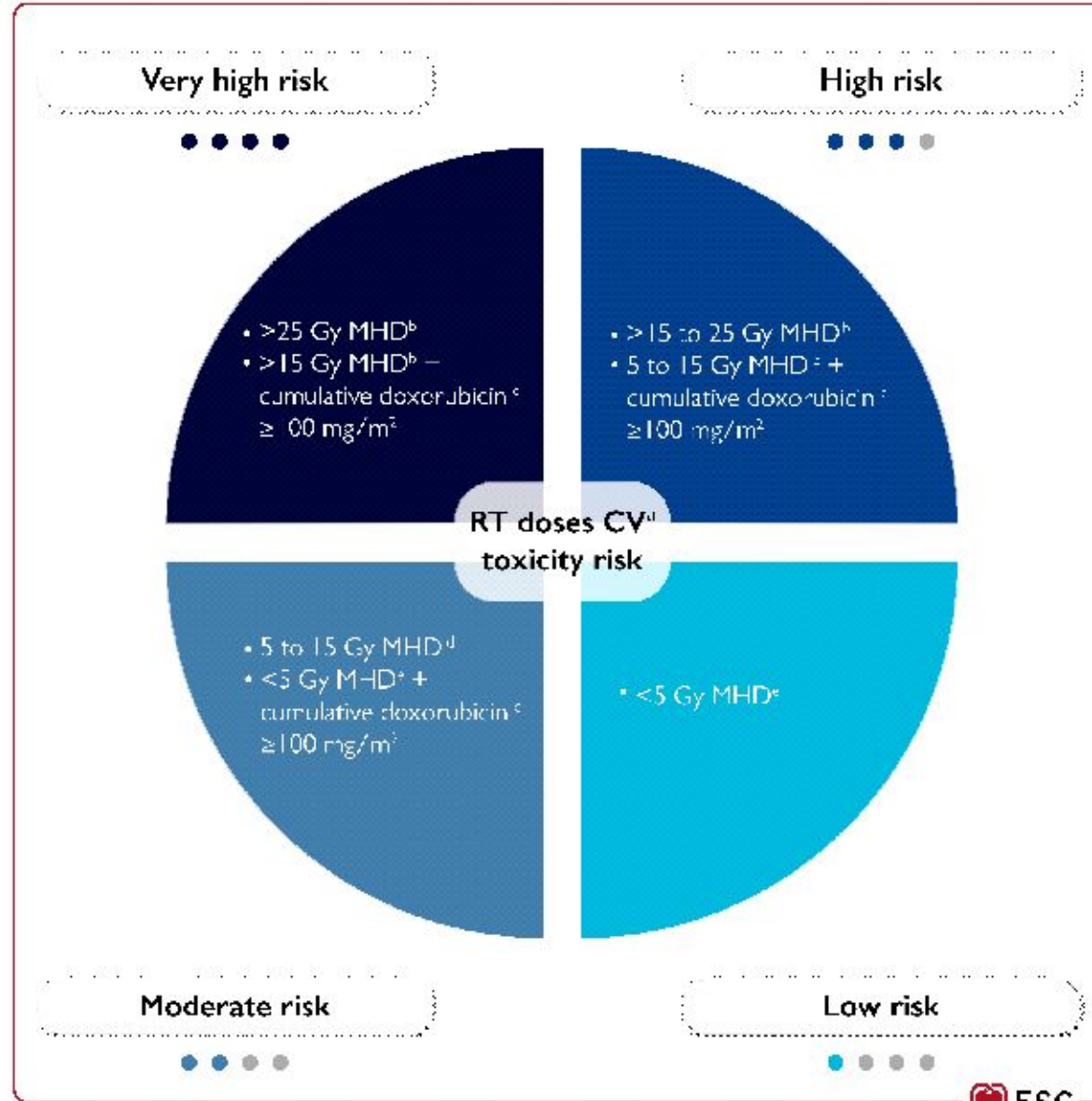
 Common: 1% to < 10% incidence
  Rare: < 1% incidence

 Rare: < 0.1% incidence

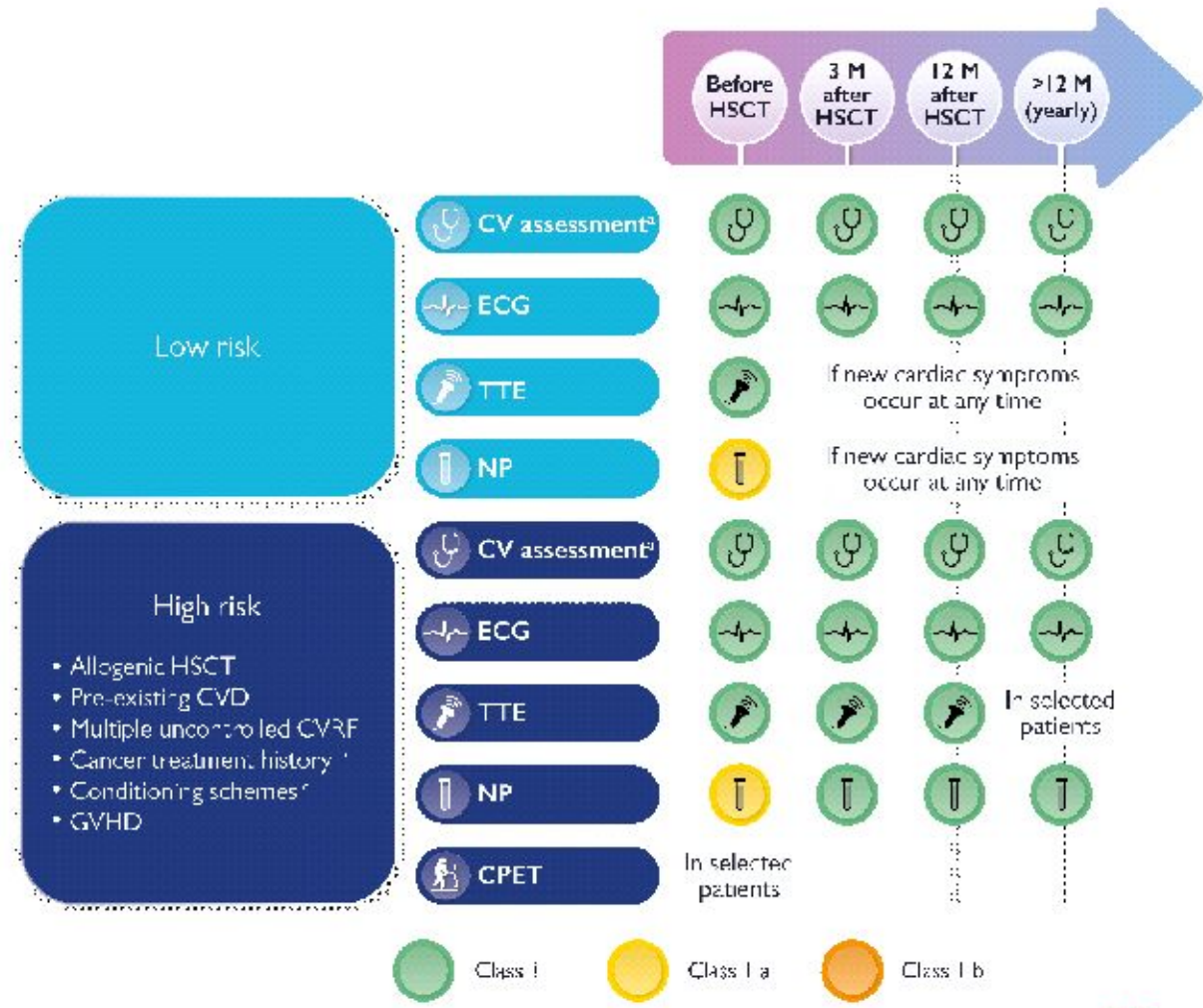
ALK inhibitor- and EGFR inhibitor-related cardiovascular toxicities

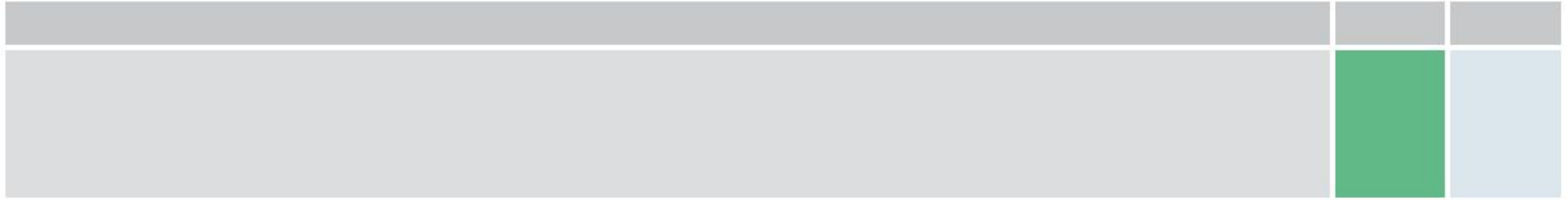


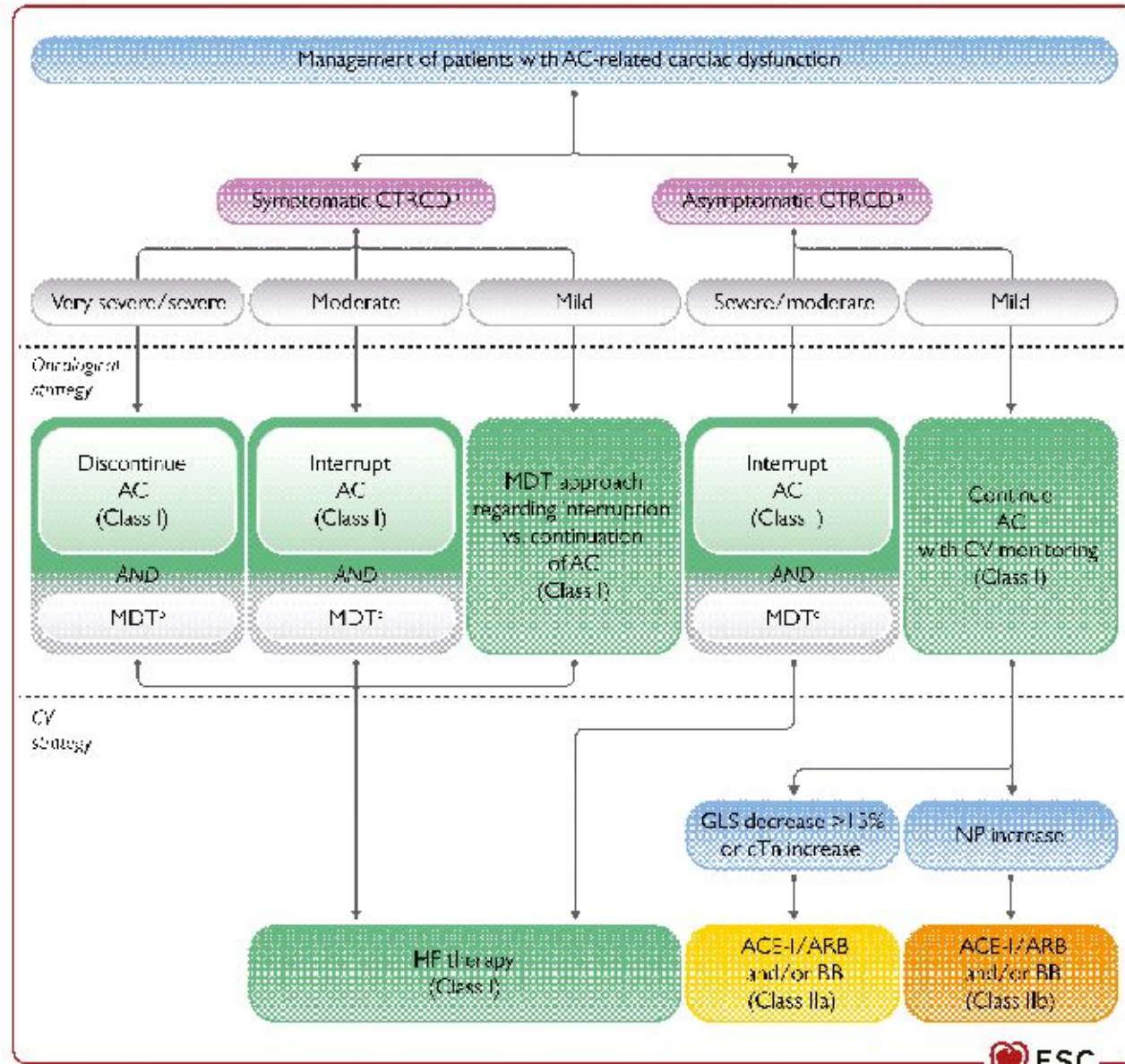
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	Green	Blue
	Yellow	Light Blue
	Yellow	Light Blue
	Yellow	Blue
	Yellow	Light Blue

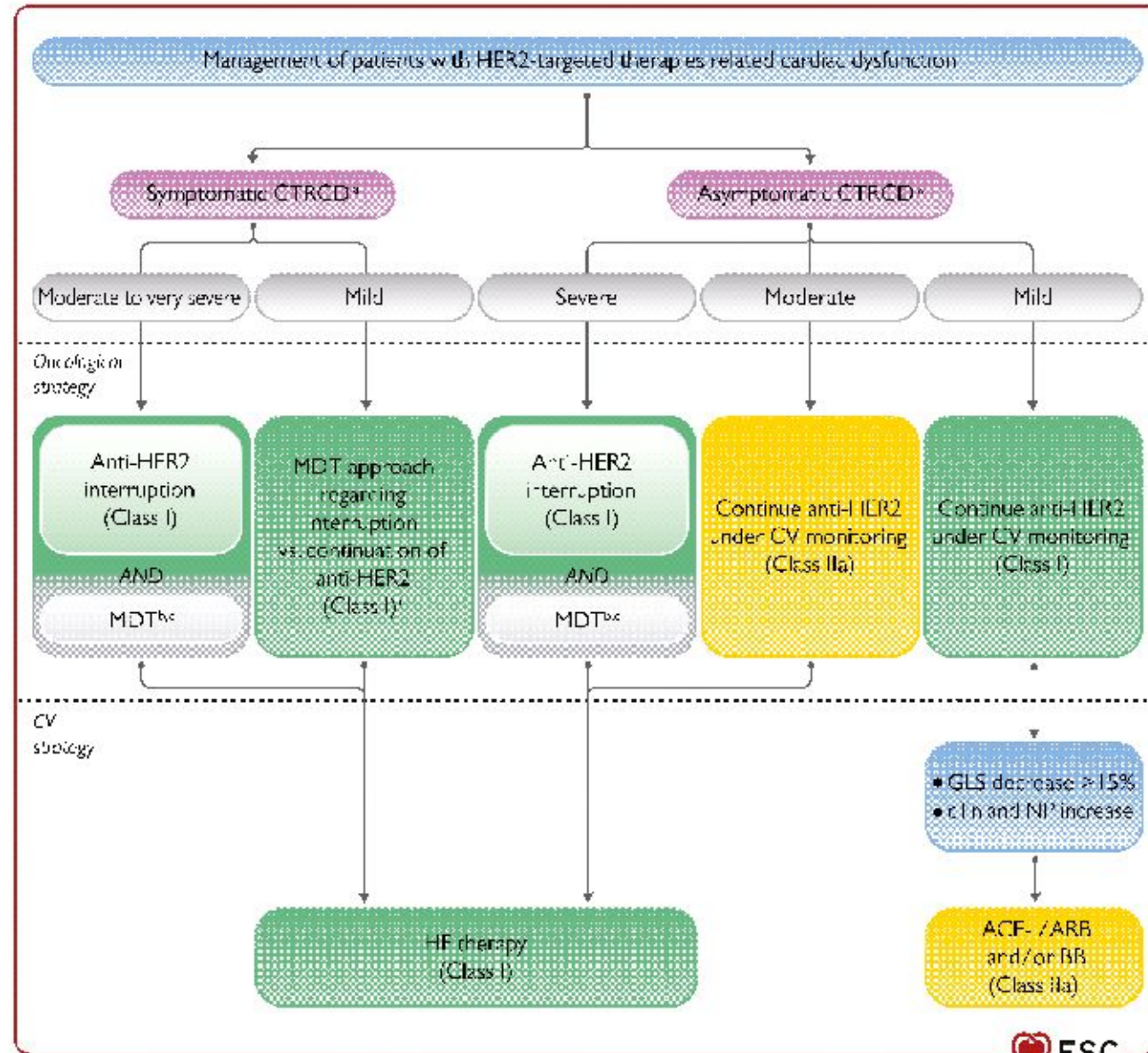


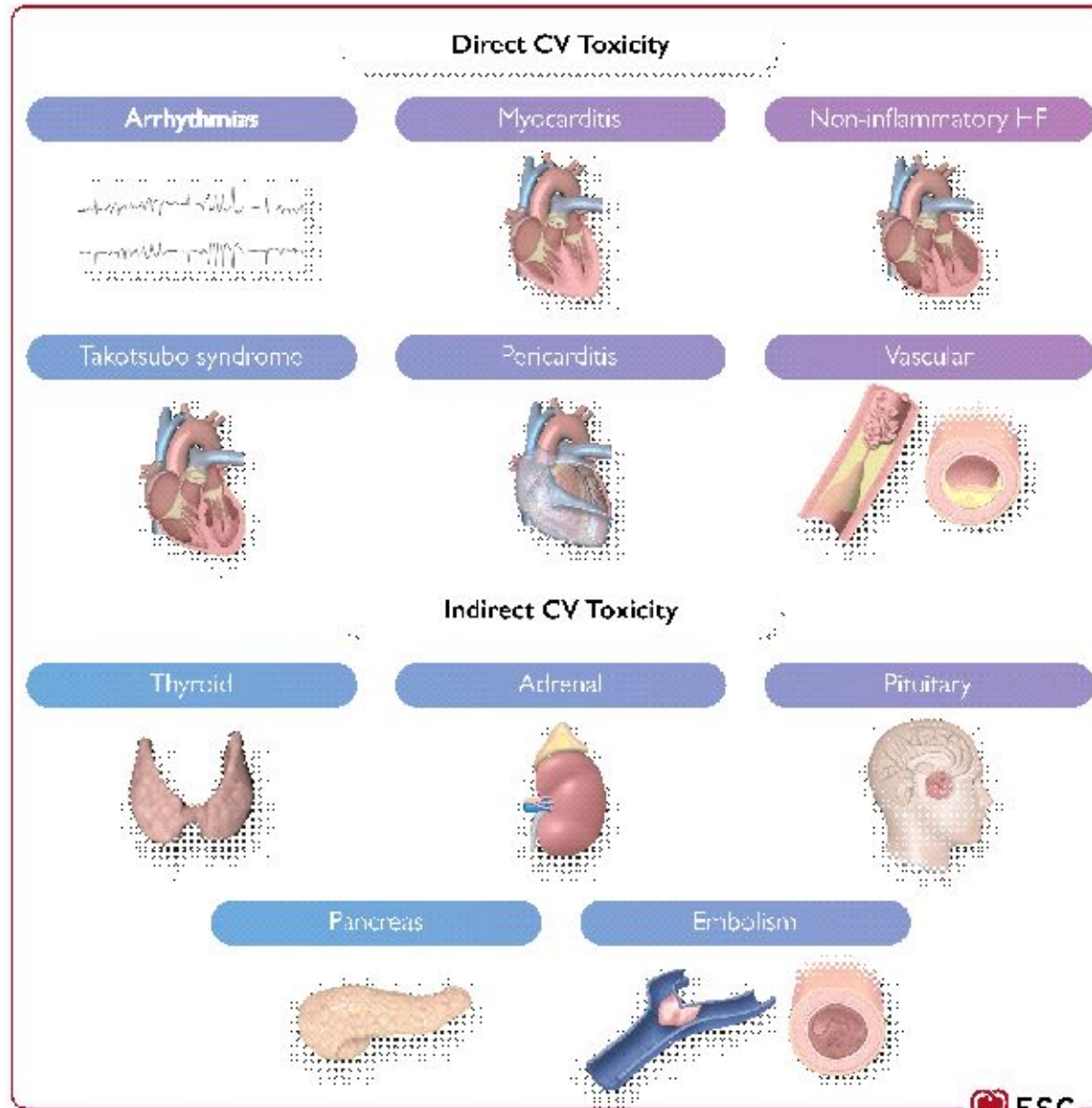
Cardiovascular surveillance in patients referred for haematopoietic stem cell transplantation

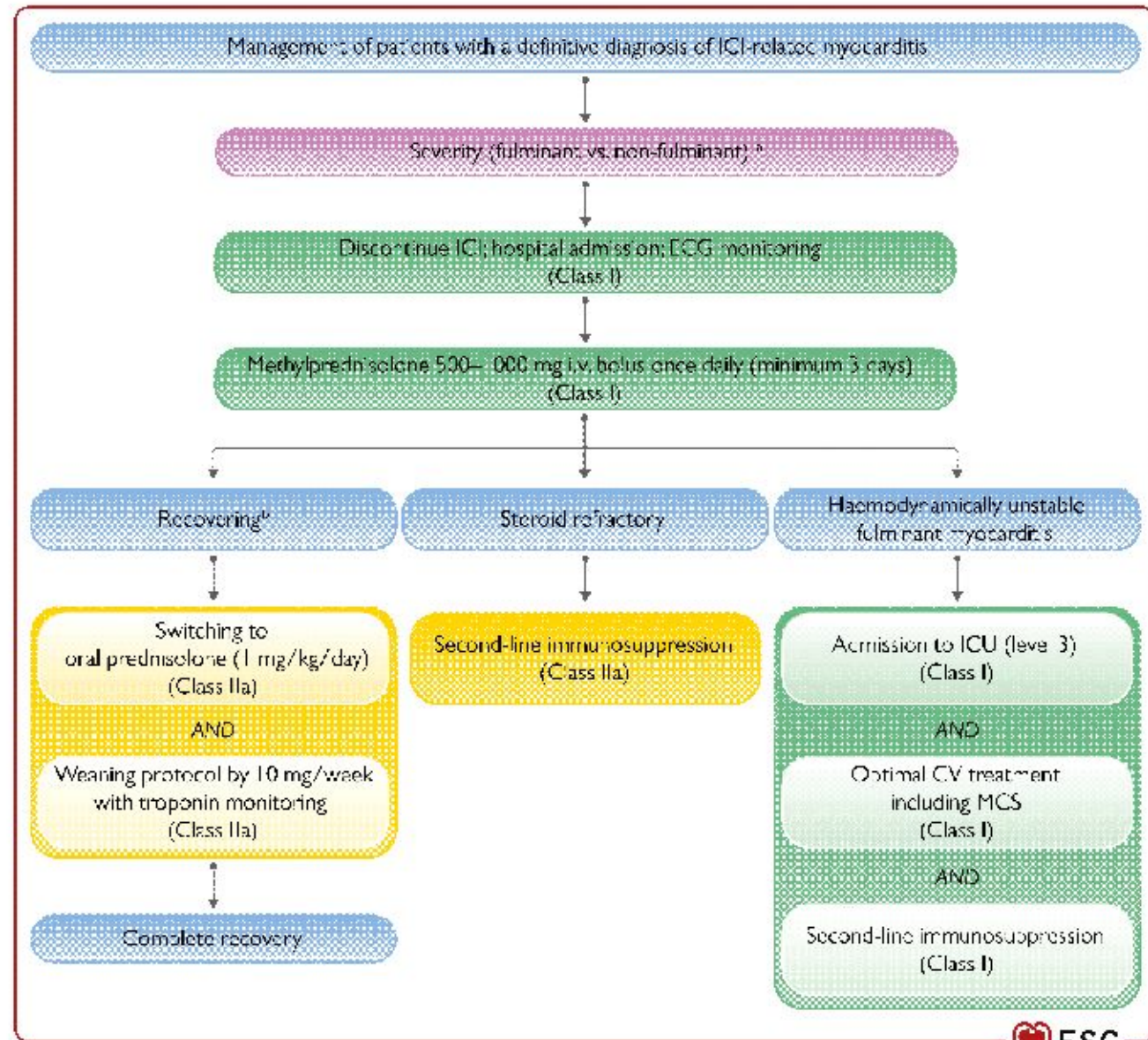


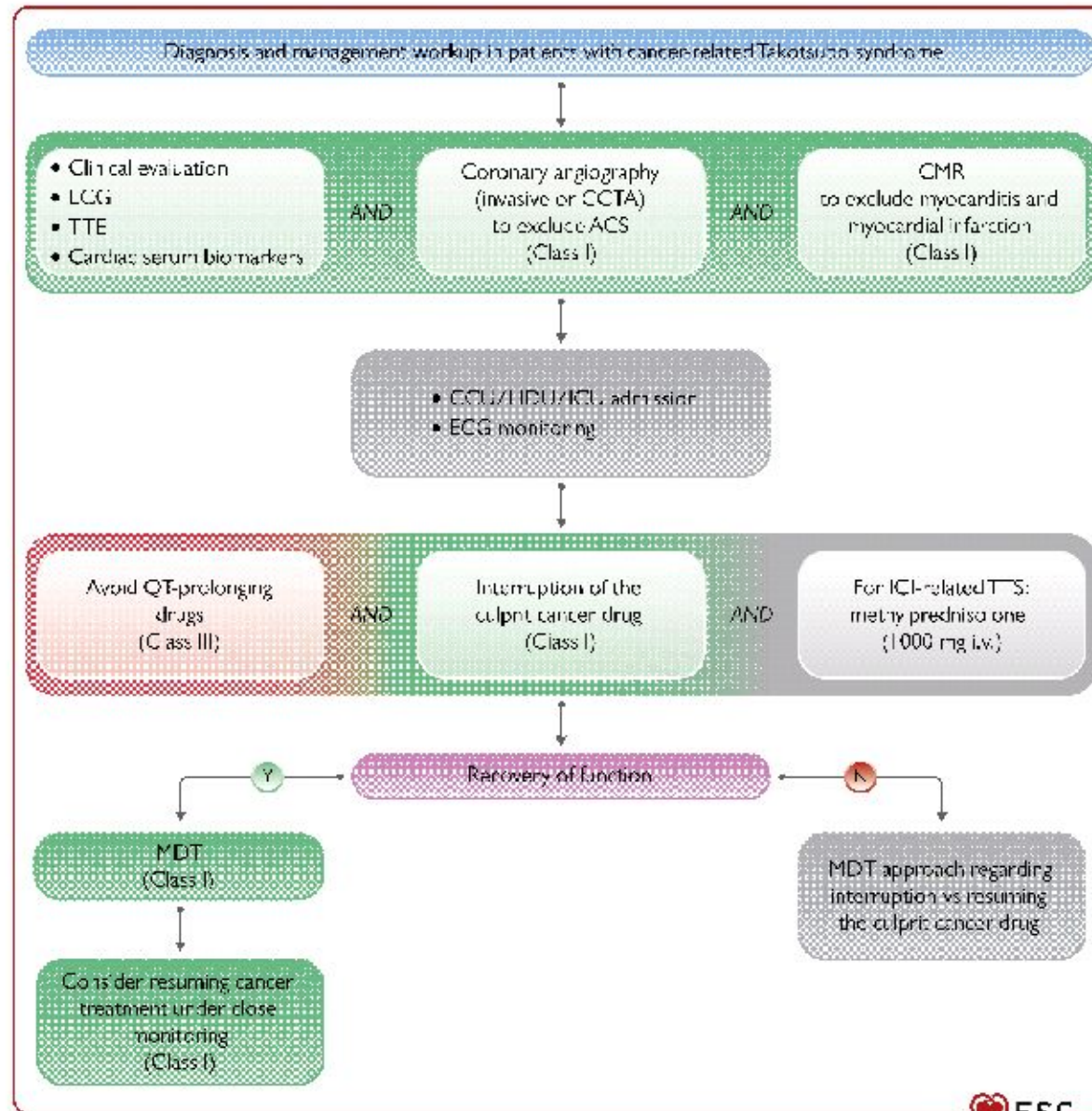


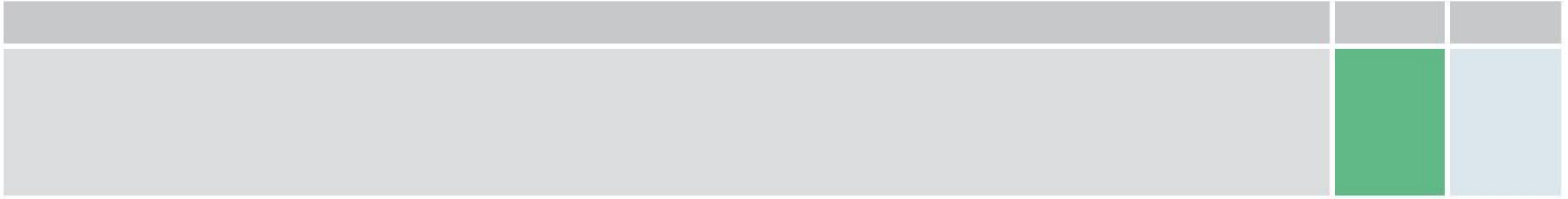




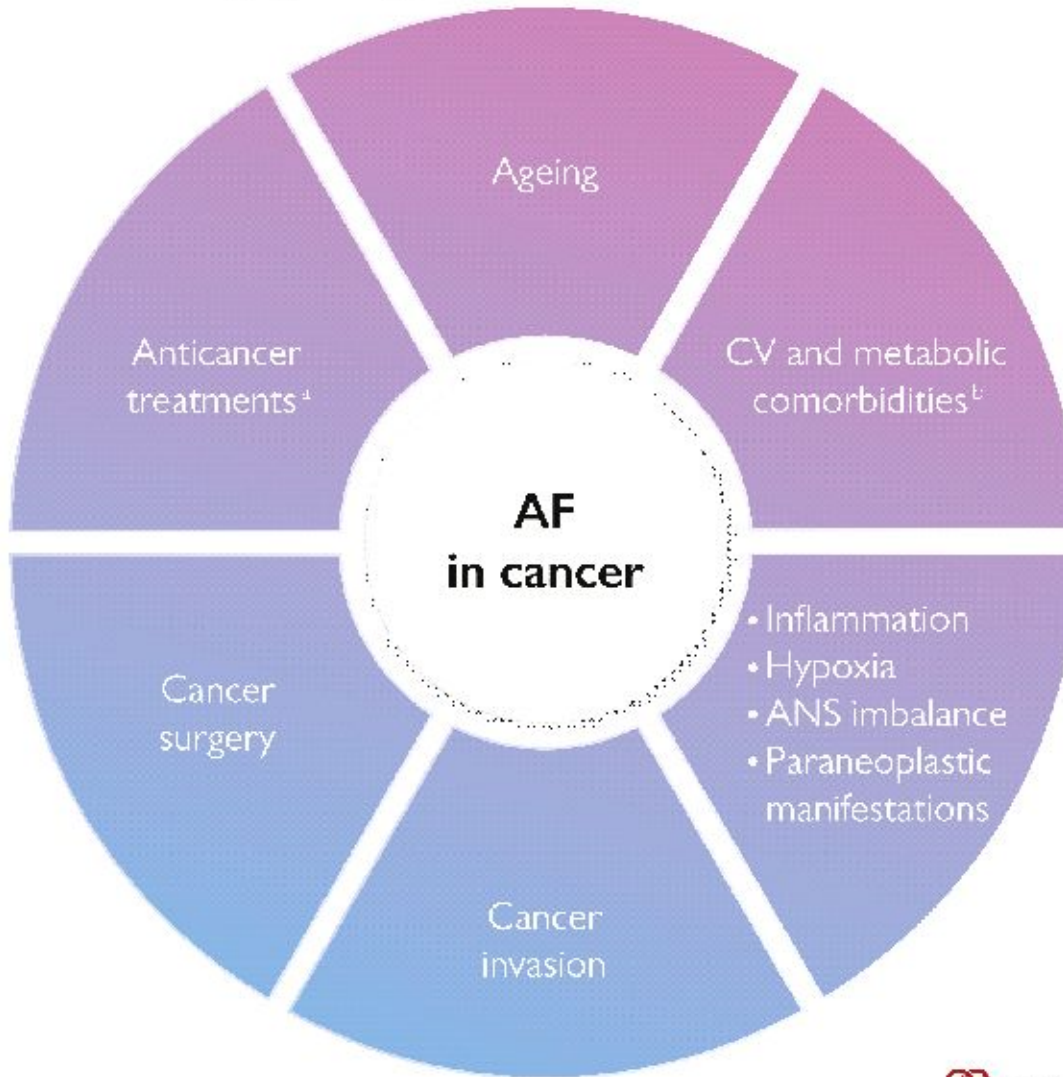




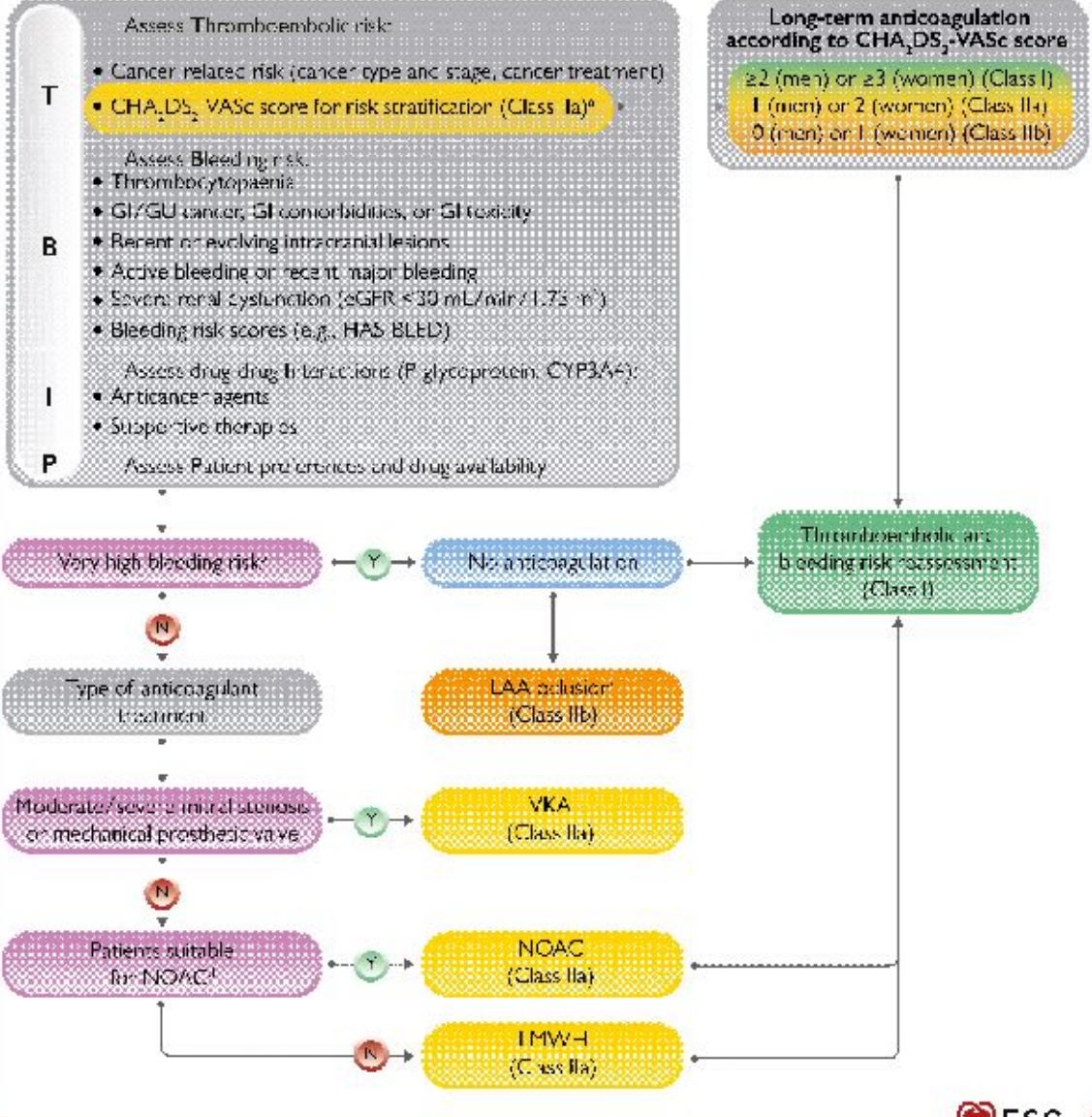




Pathophysiology of AF associated with cancer

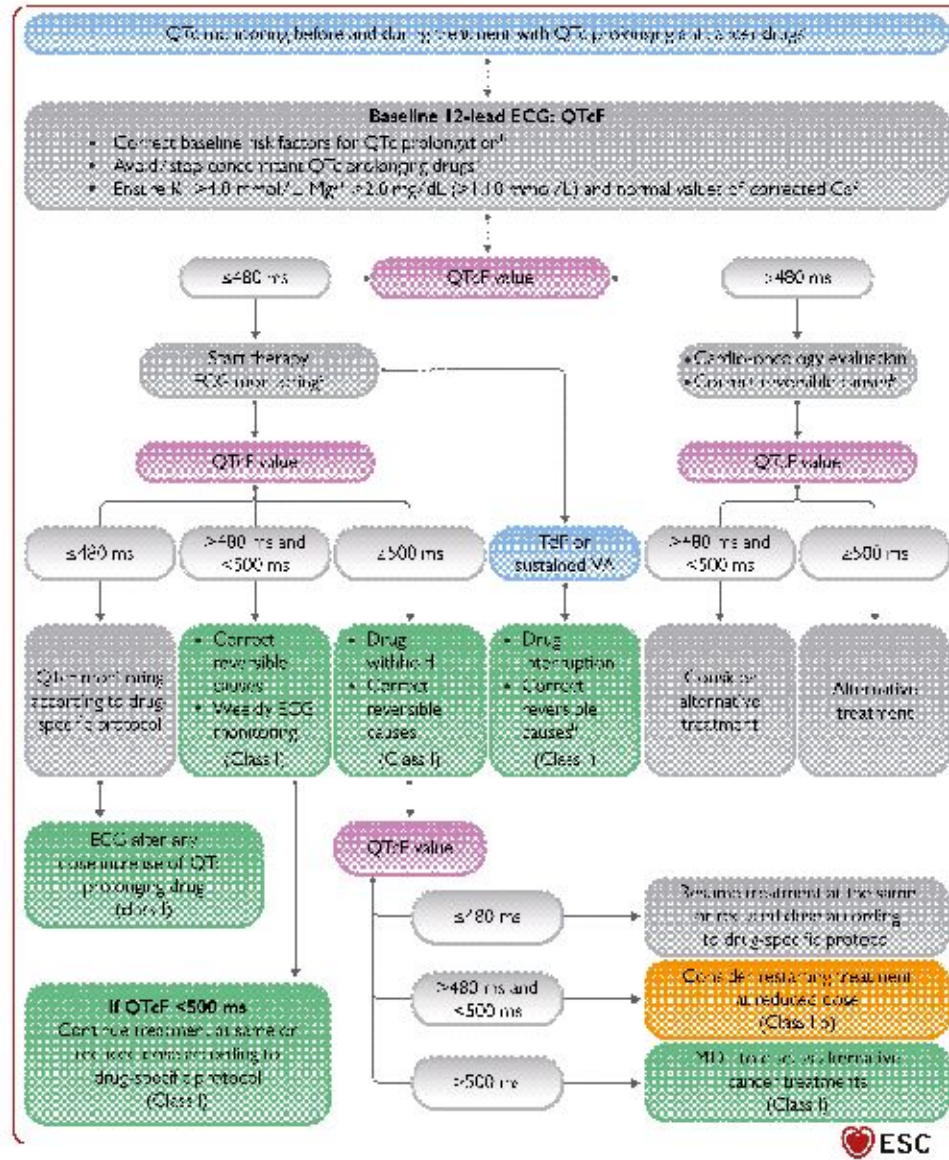


Structured approach to anticoagulation for AF in patients with cancer





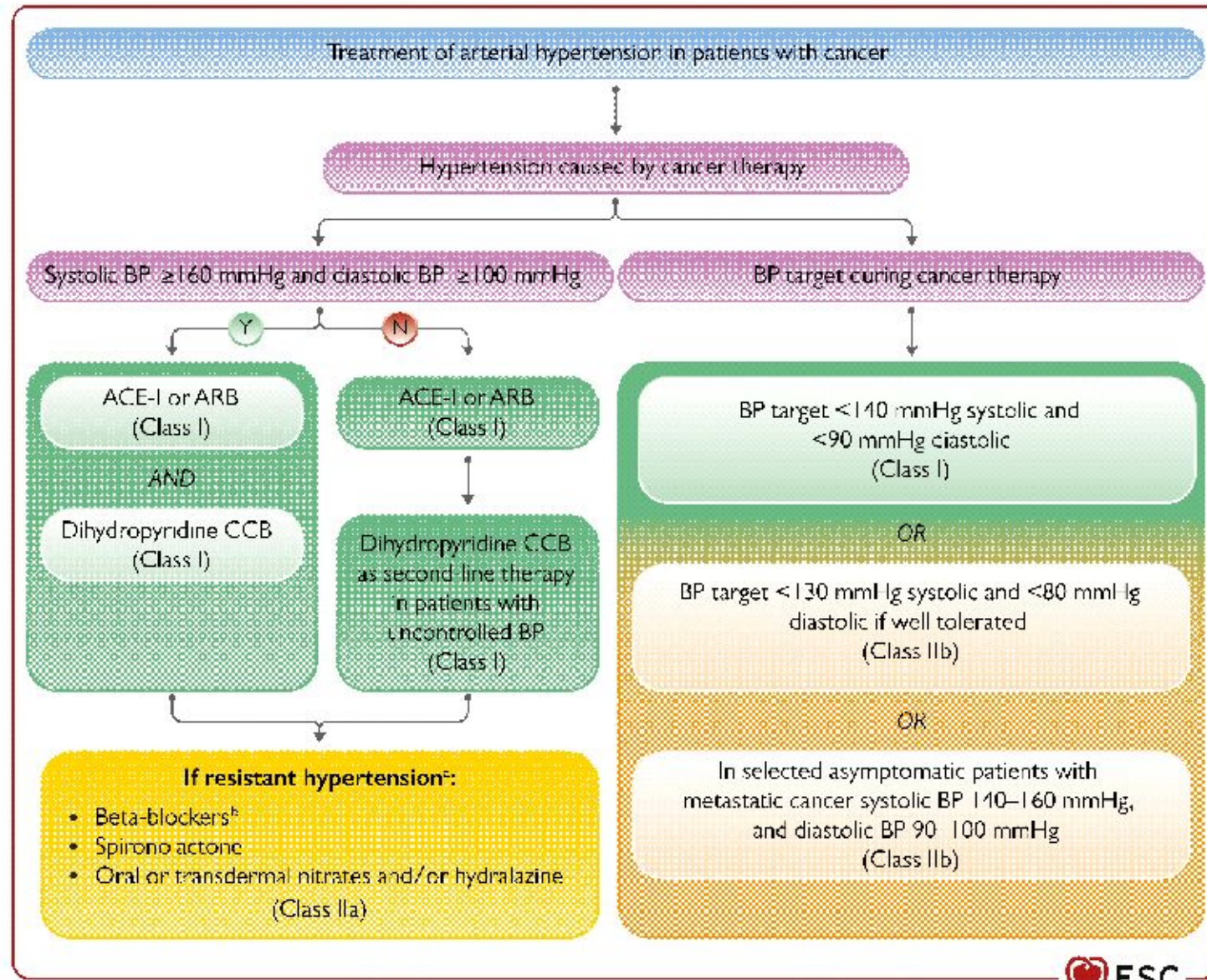
[Redacted]			
[Redacted]			
[Redacted]	[Redacted]	[Redacted]	[Redacted]



Recommended threshold for asymptomatic hypertension treatment in different clinical scenarios

Home BP mmHg	CS	Curable cancer during treatment	Metastatic cancer Prognosis >3 years	Metastatic cancer Prognosis 1–3 years	Metastatic cancer Prognosis <1 year
160+	Treat	Treat	Treat	Treat	Treat
140–159	Treat	Treat	Treat	Consider treatment	May treat
135–139	Treat	May treat	Consider treatment	May treat	None
130–134	May treat	None	None	None	None
<130	None	None	None	None	None

● Class I
 ● Class IIa
 ● Class IIb



	Green	Blue
	Green	Light Blue
	Green	Light Blue
	Red	Light Blue

Risk factors for VTE in patients with cancer

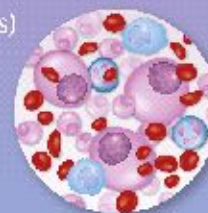
Patient-related factors

- Ageing
- Comorbidities^a
- Sex (female)
- Hereditary coagulation defects^b
- Performance status
- Prior VTE history



Cancer-related factors

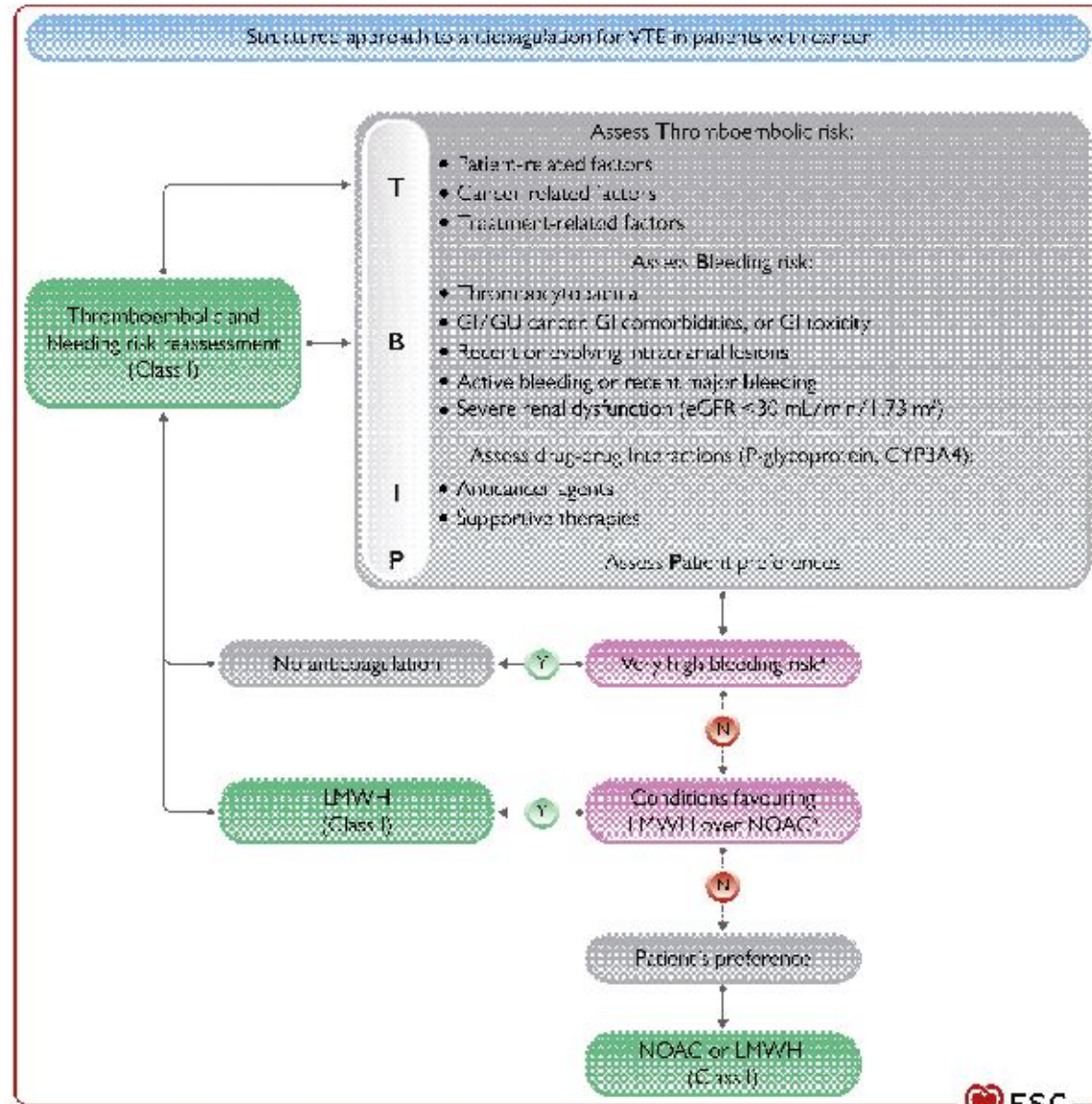
- Cancer type
- Genetic characteristics (JAK2 or K-ras mutations)
- Histology (adenocarcinoma)
- Initial period after diagnosis
- Primary site (pancreas, stomach, ovaries, brain, lung, myeloma)
- Stage (advanced, metastatic)



Treatment-related factors

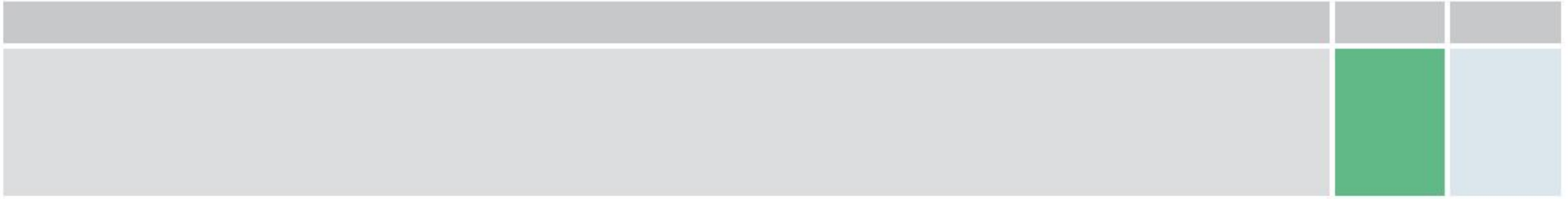
- Cancer therapy^c
- Central venous catheters
- Hospitalization
- Major surgery



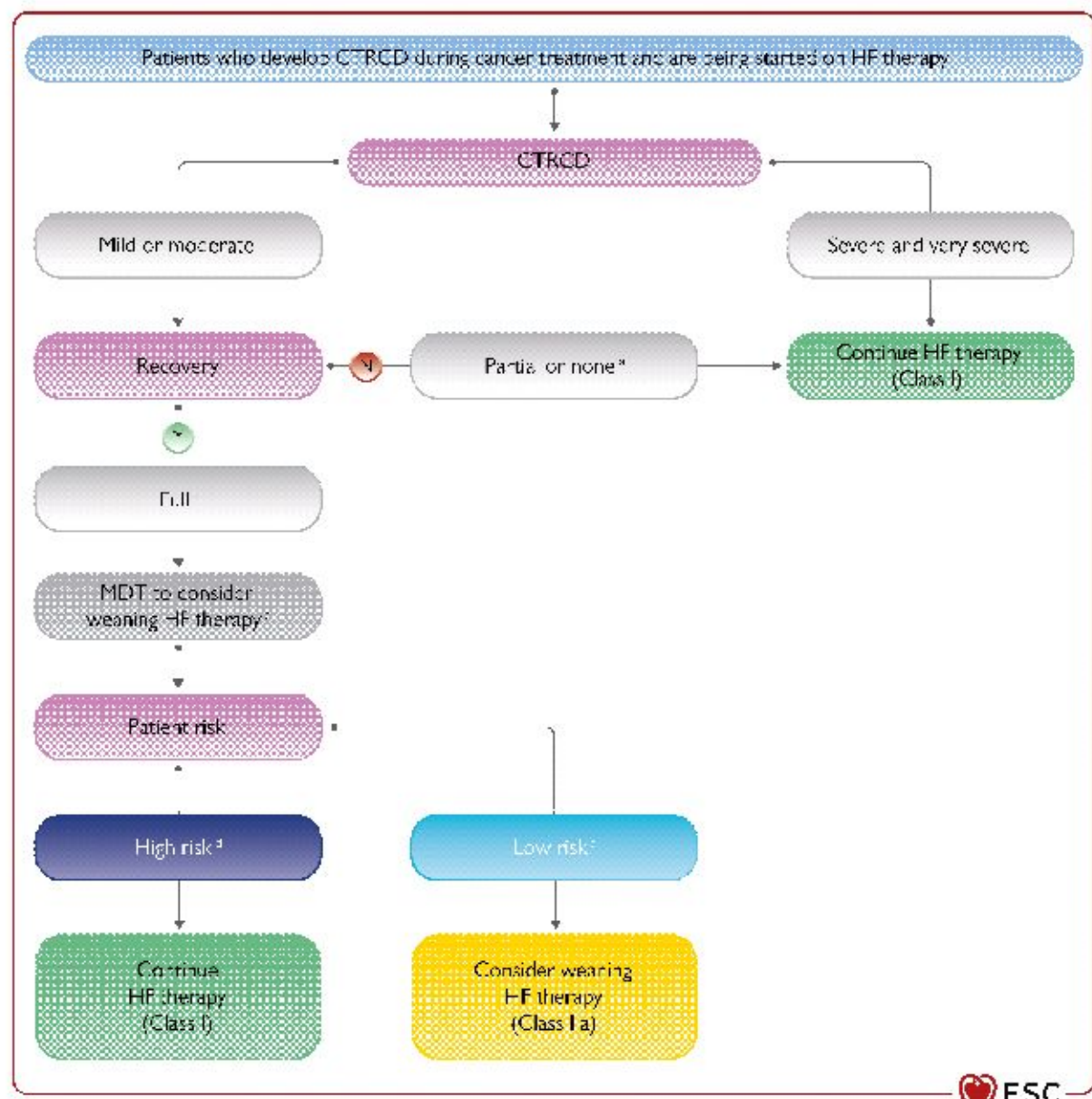


	Green	Teal
	Green	Teal
	Orange	Light Blue
	Yellow	Teal
	Green	Light Blue





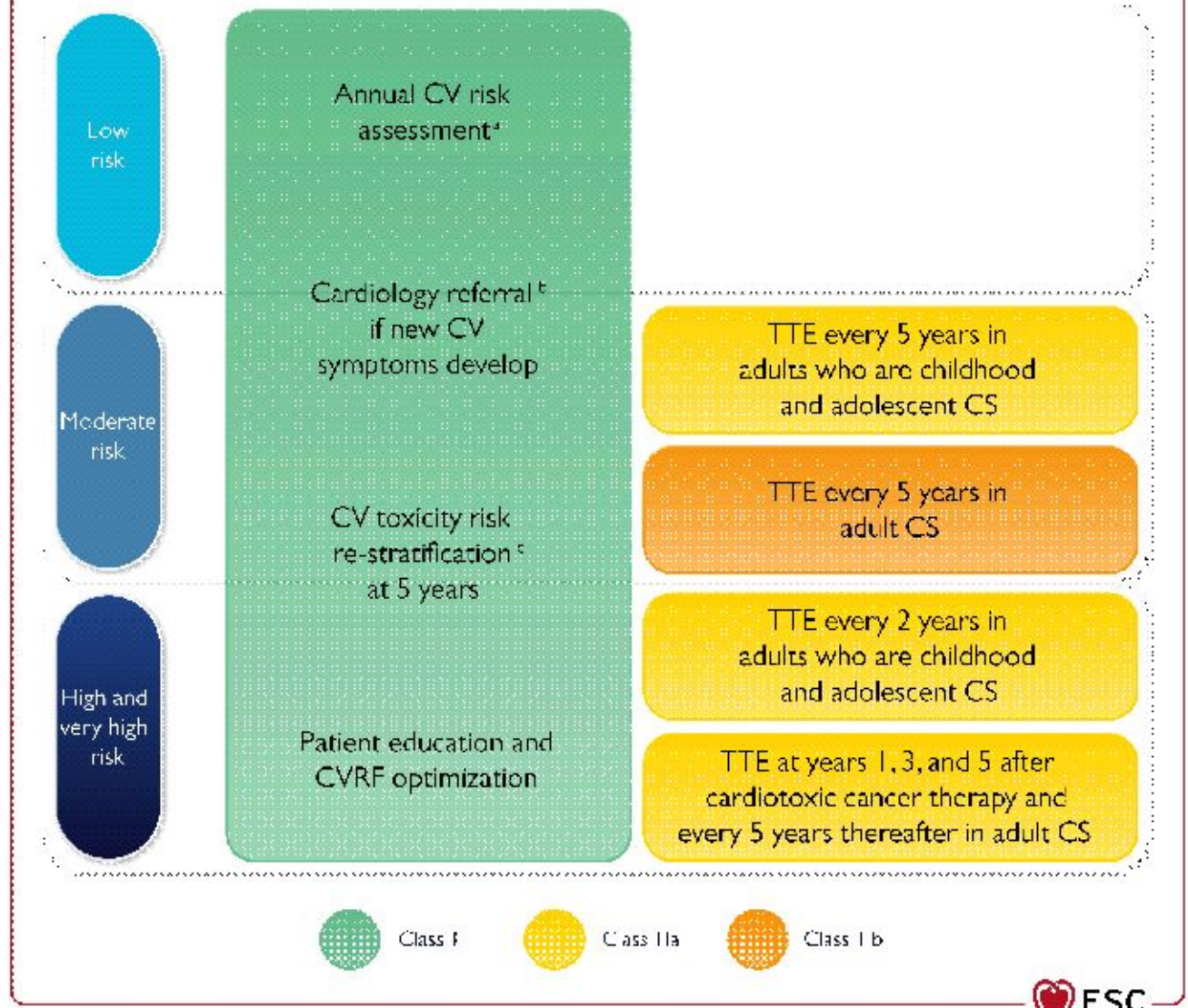




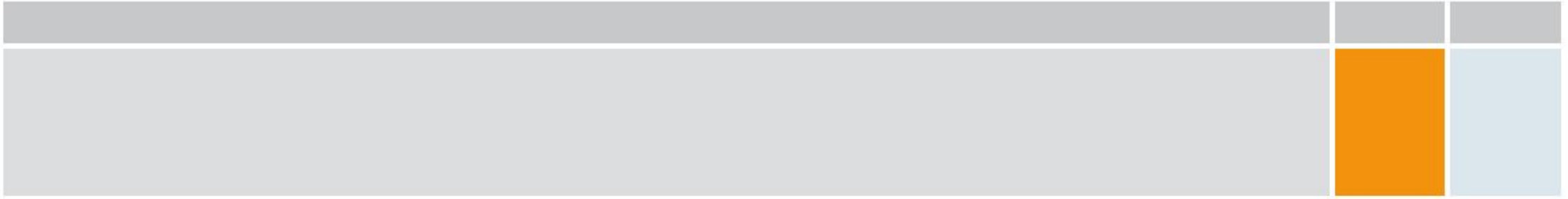
	Green	Blue
	Green	Light Blue
	Green	Light Blue
	Yellow	Blue
	Yellow	Blue

				1

Long-term surveillance in asymptomatic CS



	Green	Light Blue
	Green	Light Blue
	Green	Light Blue
	Orange	Dark Blue



Pulmonary artery

- Sarcoma

Right atrium

- Lipoma
- Lymphoma
- Metastasis
- Myxoma
- Sarcoma

Right ventricle

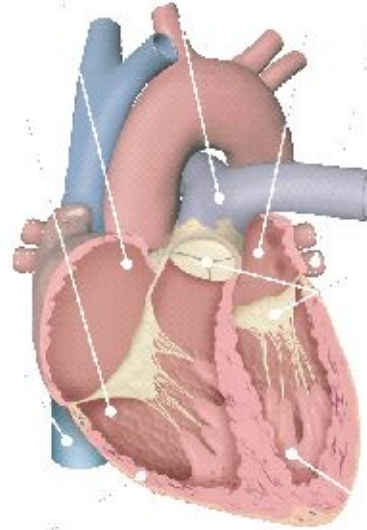
- Fibroma
- Lipoma
- Lymphoma
- Metastasis
- Rhabdomyoma

Inferior cava vein

- Leiomyoma
- Renal tumour

Pericardium

- Lipo sarcoma
- Lipoma
- Lymphoma
- Mesothelioma
- Metastasis


Left atrium

- Lipoma
- Metastasis
- Myxoma
- Sarcoma

Pulmonary veins

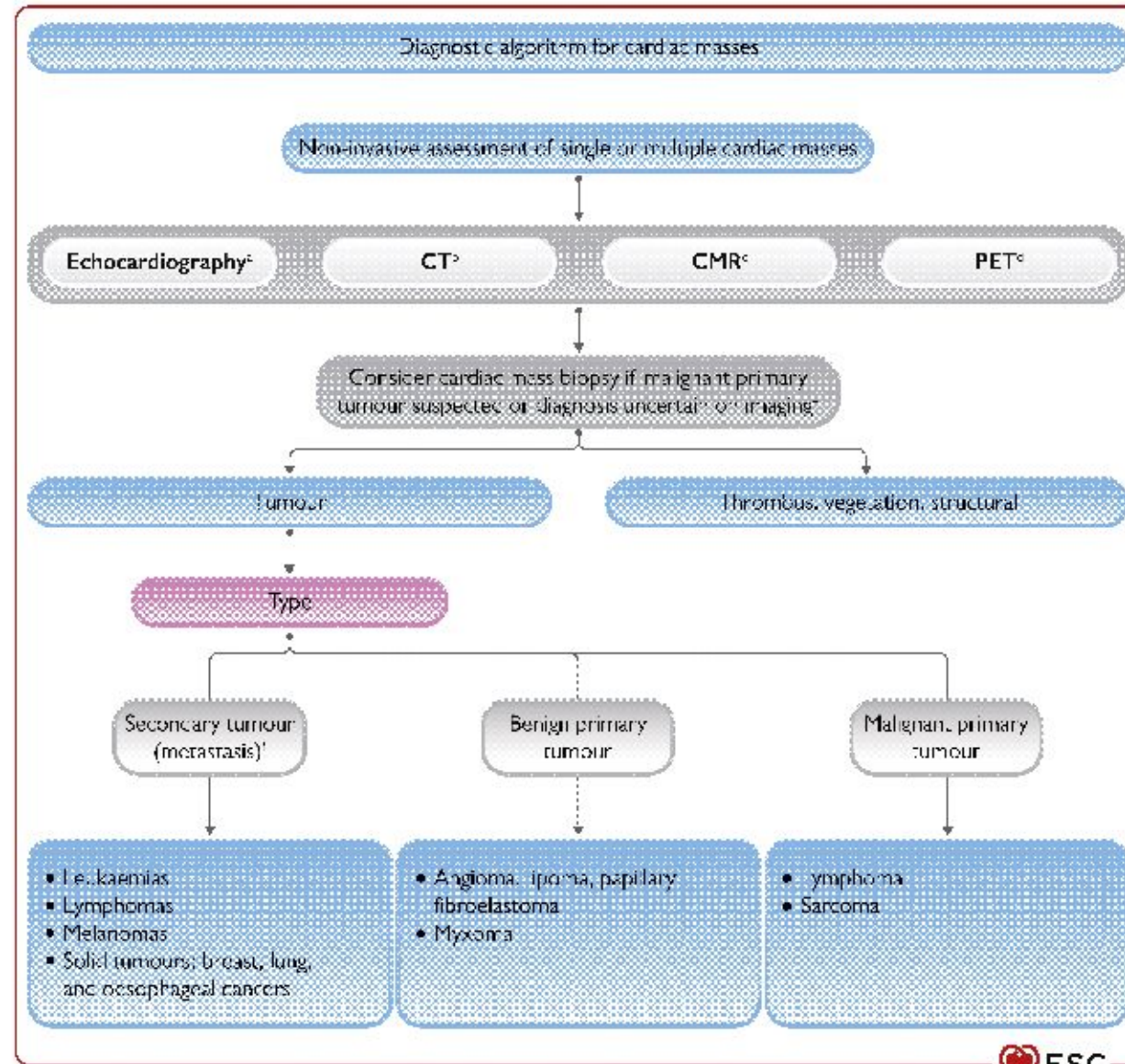
- Lung tumours
- Sarcoma

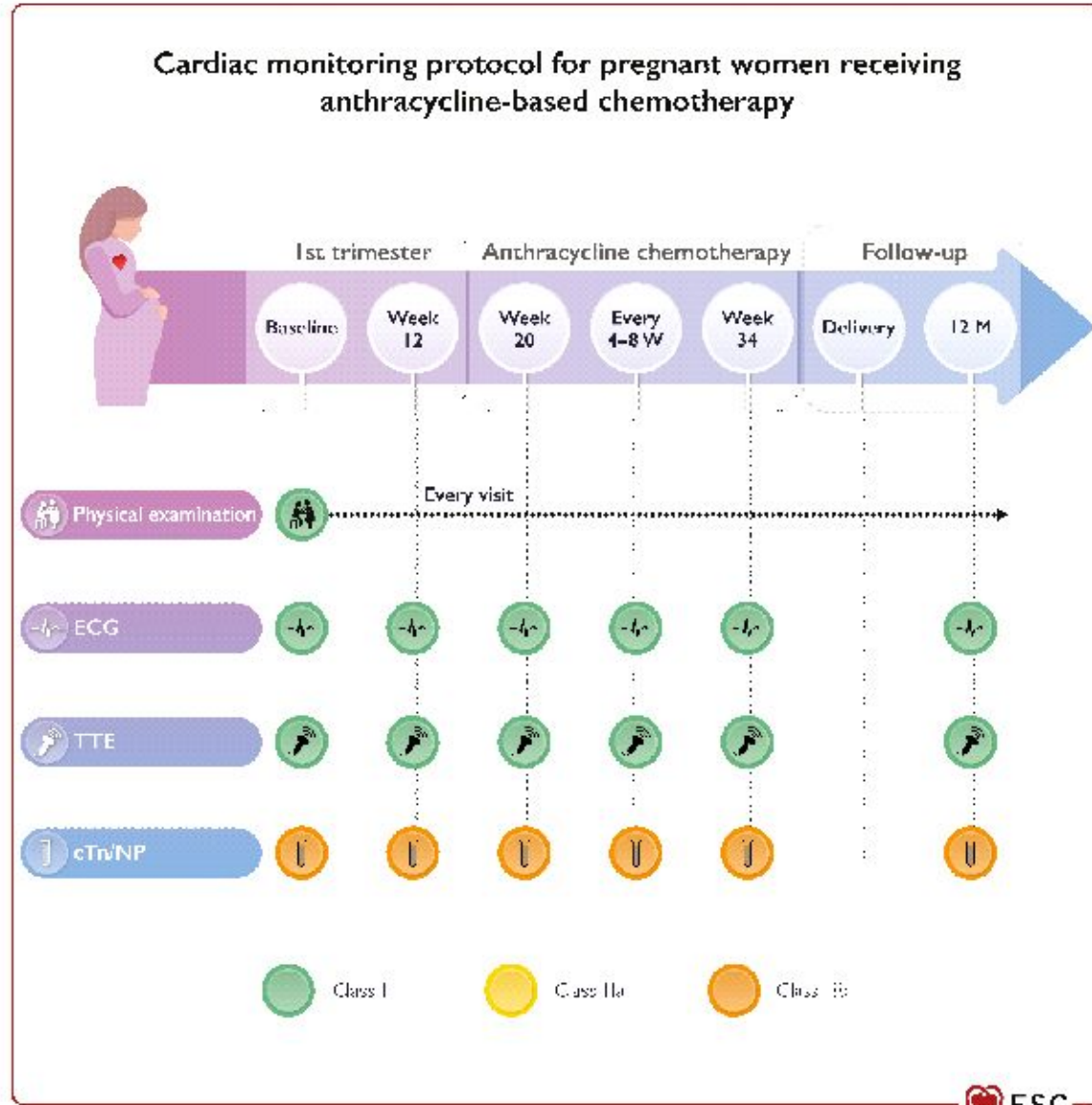
Valves

- Fibroelastoma
- Metastasis

Left ventricle

- Fibroma
- Lipoma
- Lymphoma
- Metastasis
- Rhabdomyoma
- Sarcoma



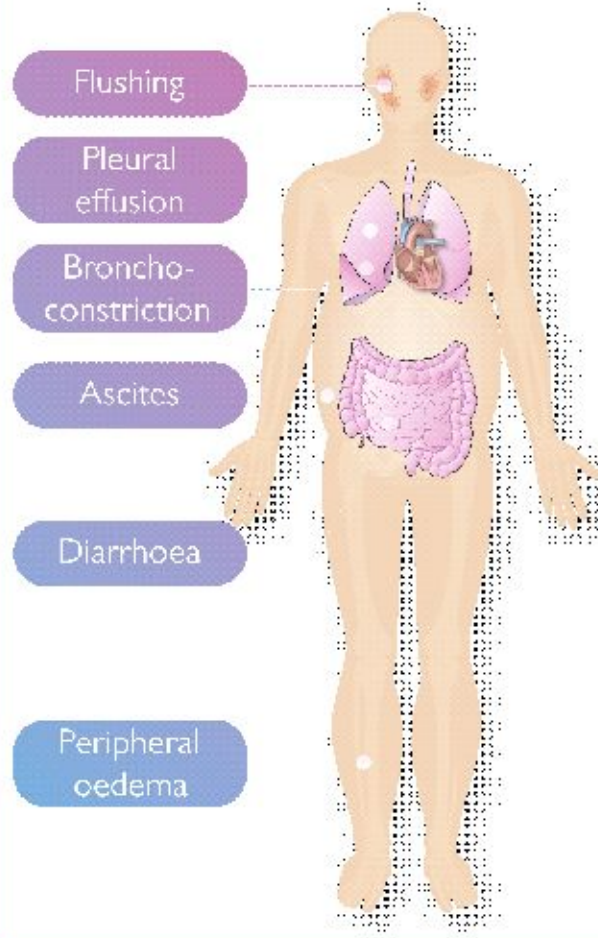


	Green	Light Blue
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	Yellow	Light Blue
	Orange	Light Blue

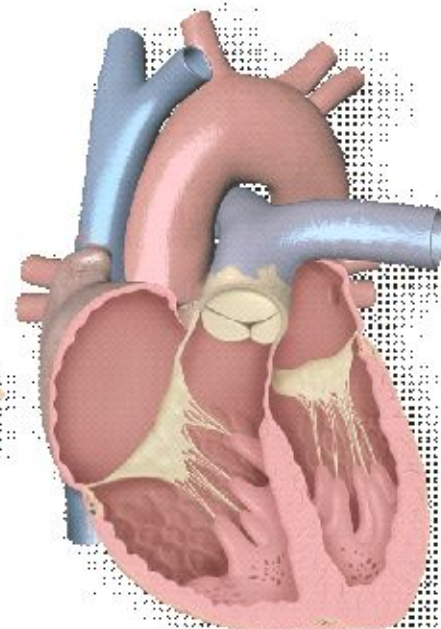
	Green	Light Blue
	Yellow	Light Blue
	Green	Light Blue

Carcinoid heart disease: clinical features and diagnostic tests

Clinical features



Diagnostic and prognostic tools



Non-invasive diagnosis of AL-CA

Clinical features

Skin

- Bruising

CV

- AF/flutter
- Dyspnoea
- LHFpEF or unexplained right HF
- Hypotension or syncope
- Peripheral oedema

Nerves

- Orthostatic hypotension
- Peripheral polyneuropathy
- Polyneuropathy

Kidney

- Proteinuria
- Renal impairment

GI

- Constipation/diarrhoea
- Macroglossia
- Malabsorption/weight loss/nausea

Investigations

Laboratory^a

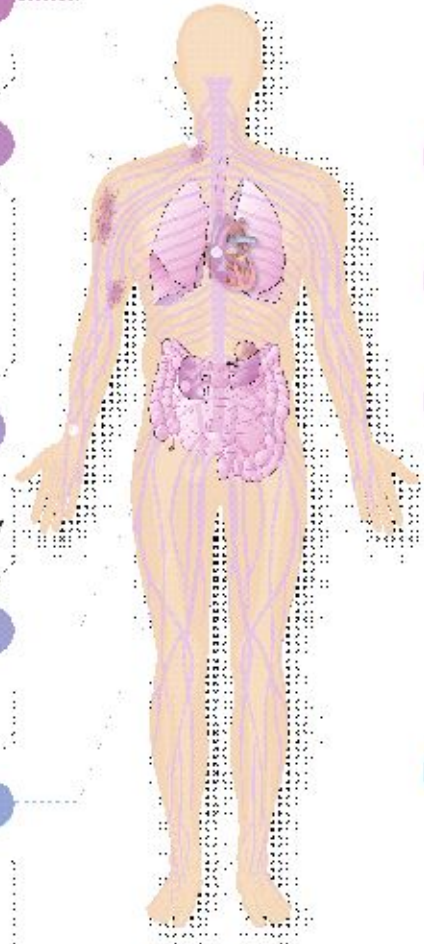
ECG^b

TTE^c

ECHO score ≥ 8 ^d

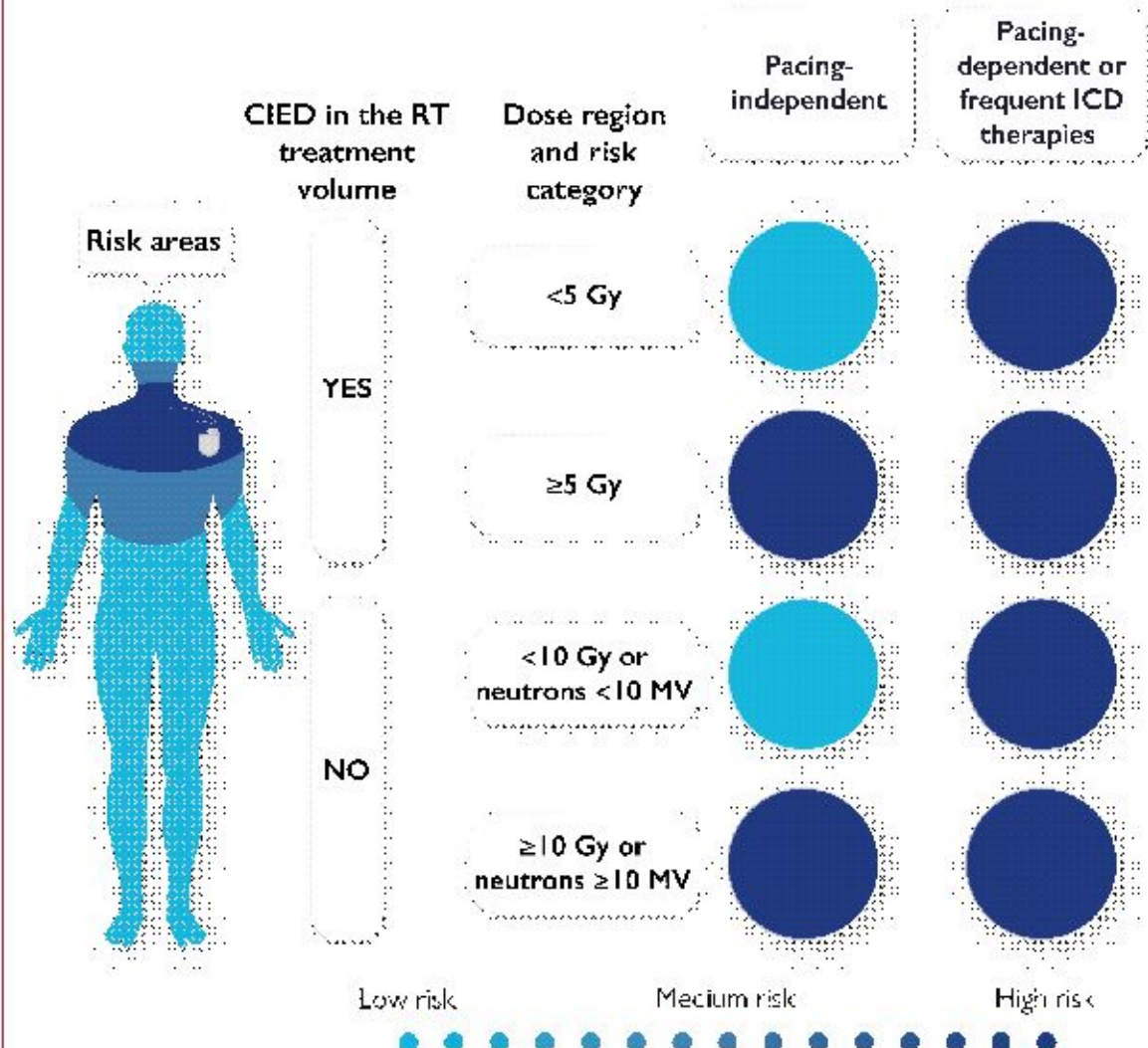
Characteristic echo findings^e

CMR^f



Assessing risk of RT to CIED

Patient

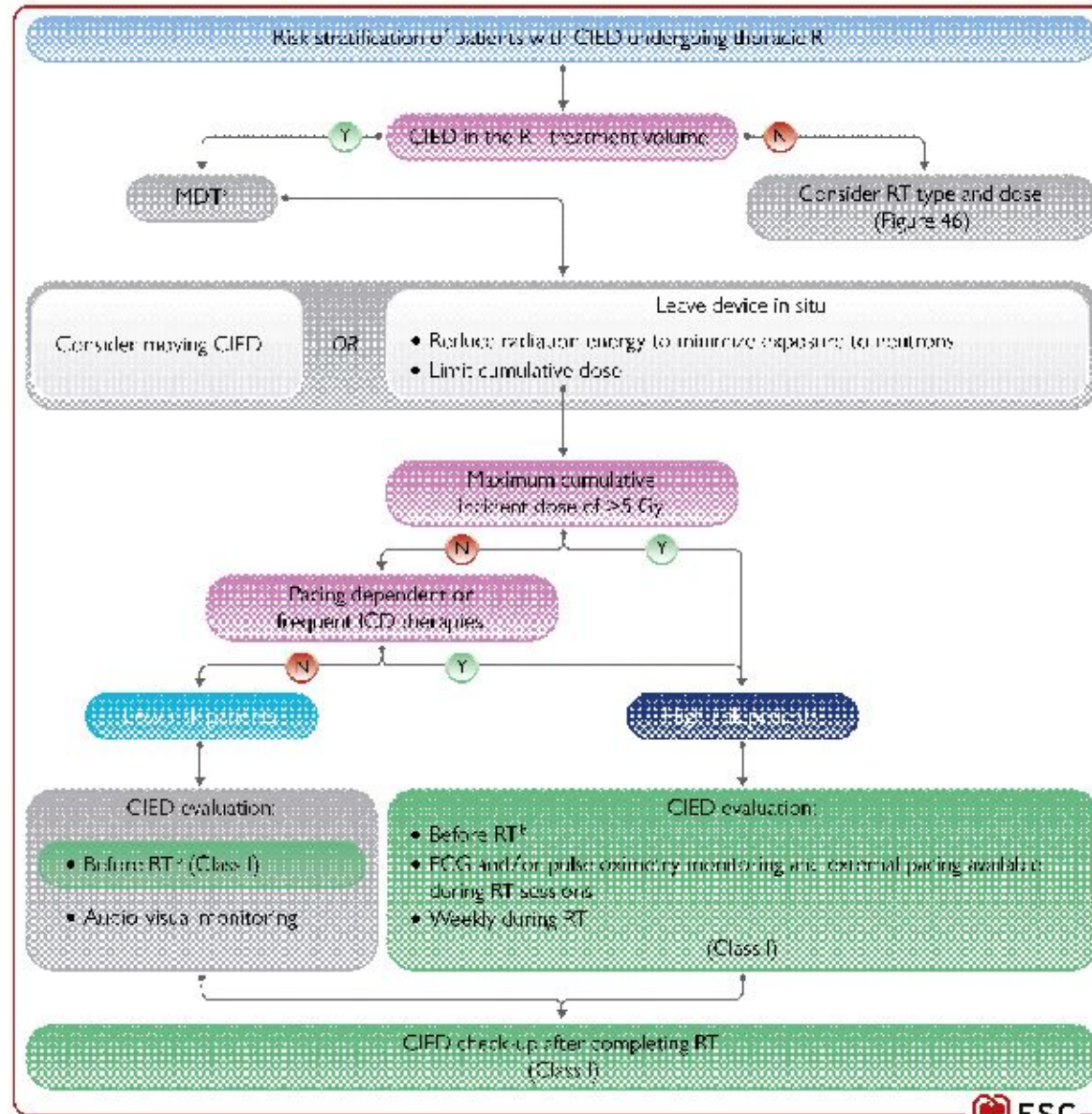


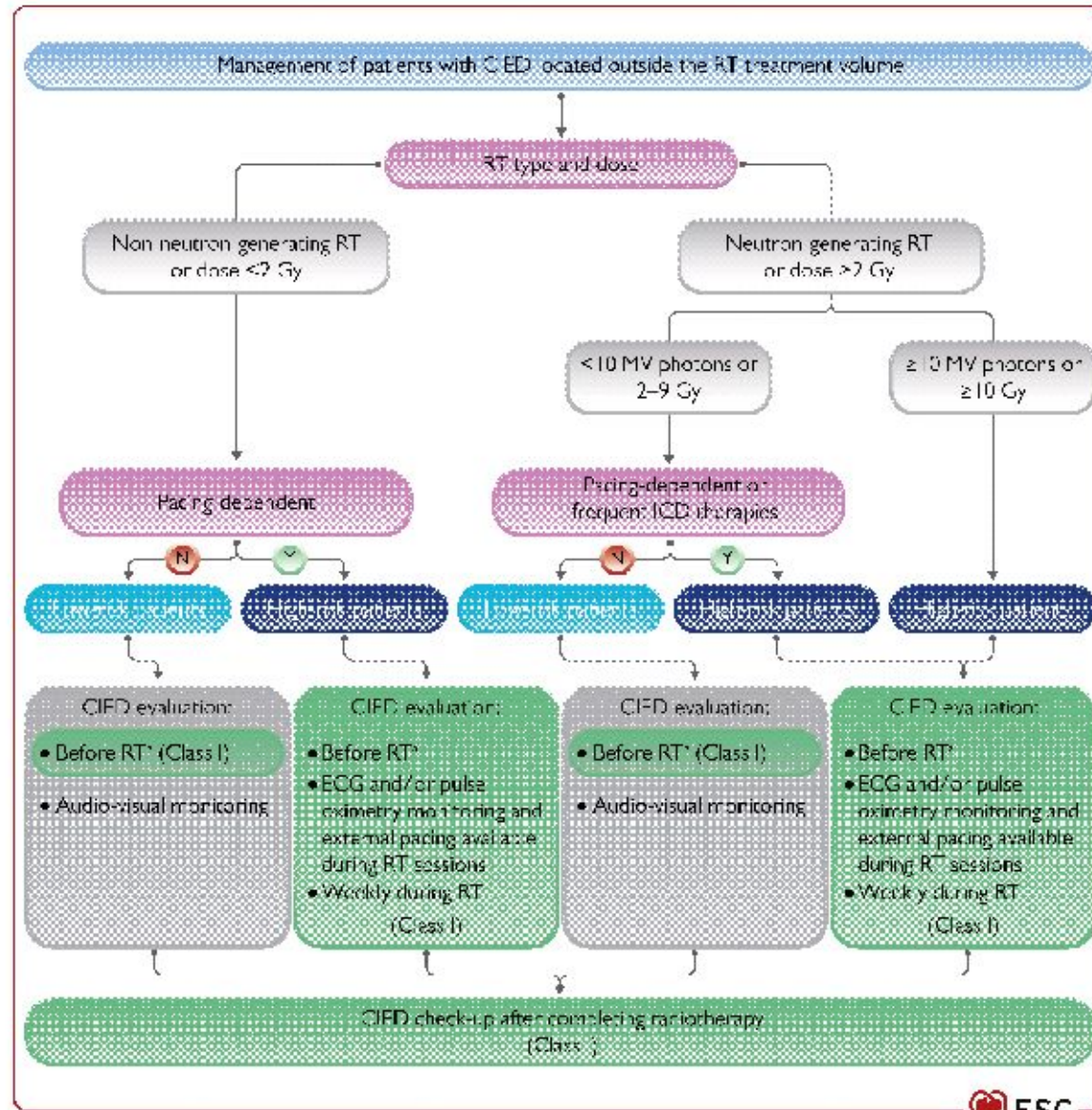
Low risk

Medium risk

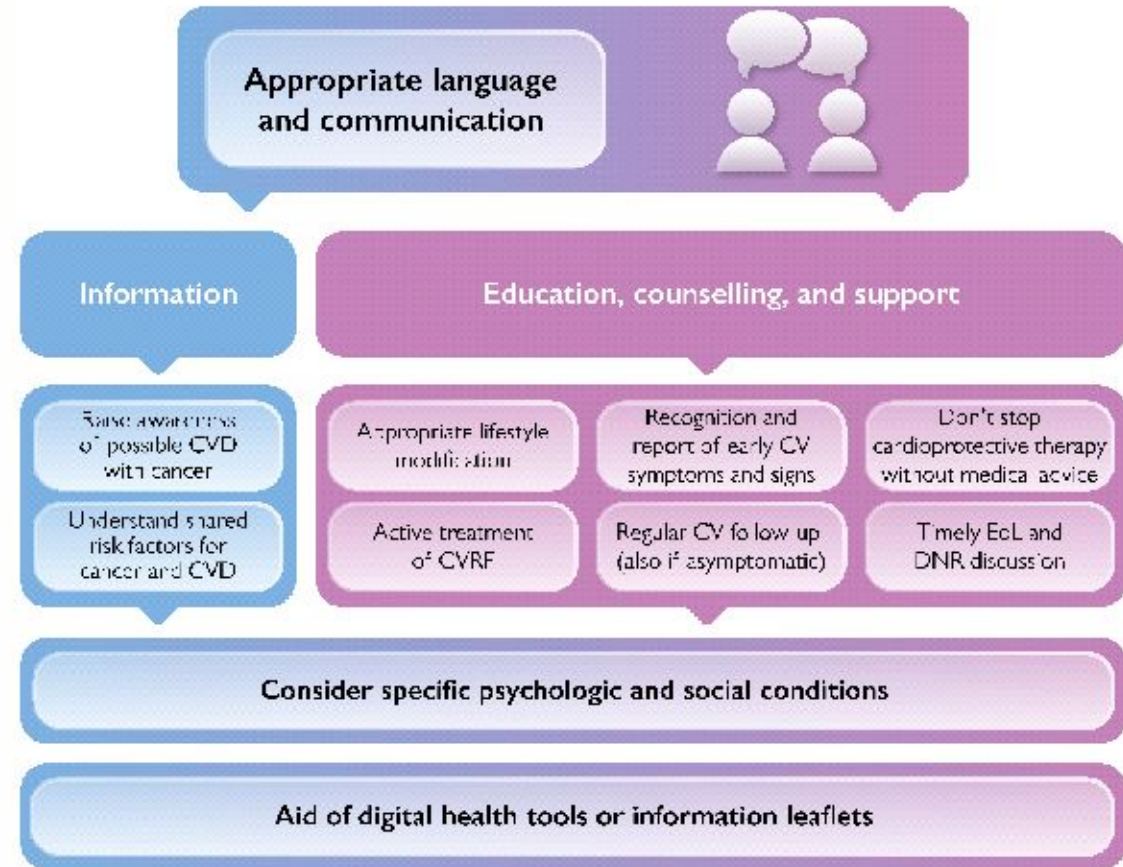
High risk



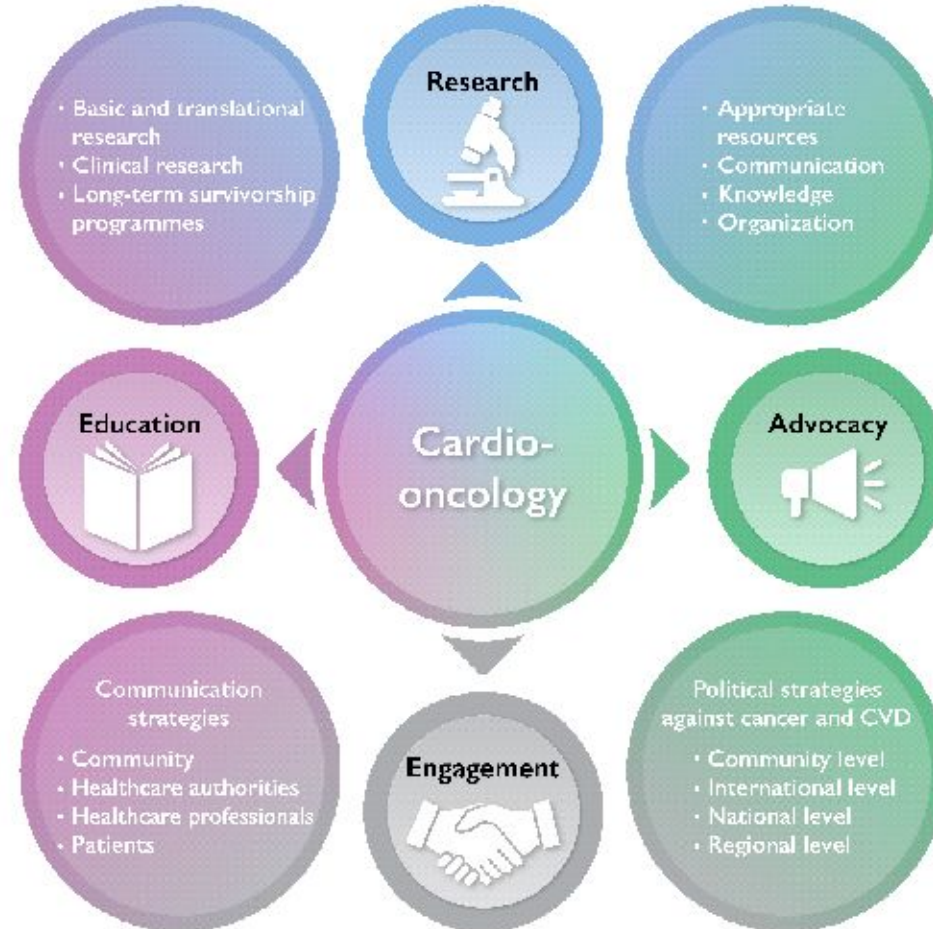


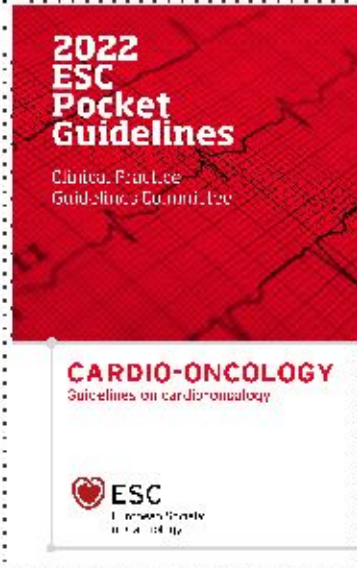


Interaction between healthcare professionals and patients with cancer




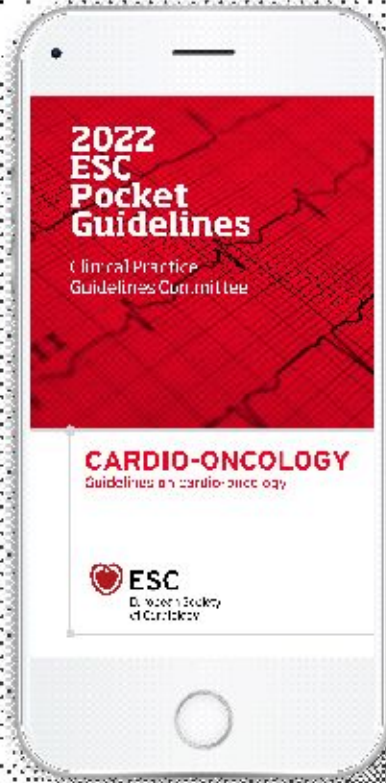
The role of scientific societies in the promotion and development of cardio-oncology






2022 ESC Pocket Guidelines
Clinical Practice Guidelines Committee

CARDIO-ONCOLOGY
Guidelines on cardio-oncology

2022 ESC Pocket Guidelines
Clinical Practice Guidelines Committee

CARDIO-ONCOLOGY
Guidelines on cardio-oncology

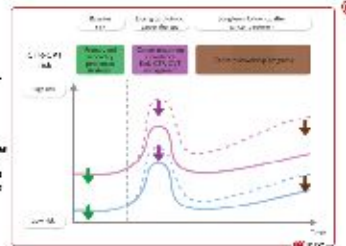


2022 ESC Guidelines on cardio-oncology
Clinical Practice Guidelines Committee

Recommendations for a generic approach to cardiovascular toxicity risk ESC categorization (1)

Recommendation	Class	Level
Oral bisphosphonates or clodronate should be used in patients with bone metastases unless contraindicated.	I	A
Oral bisphosphonates should be used in patients with bone metastases unless contraindicated.	I	C
Oral bisphosphonates should be used in patients with bone metastases unless contraindicated.	IIa	B
Oral bisphosphonates should be used in patients with bone metastases unless contraindicated.	IIb	B

Figure 1
Dynamics of cardiovascular toxicity risk of patients with cancer over their therapy continuum



Available as a free app on the ESC app store. Search 'ESC' and 'ESC Guidelines' on the App Store or Google Play.



2022 Essential messages from ESC Guidelines
Clinical Practice Guidelines Committee

CARDIO-ONCOLOGY
Guidelines on cardio-oncology

