

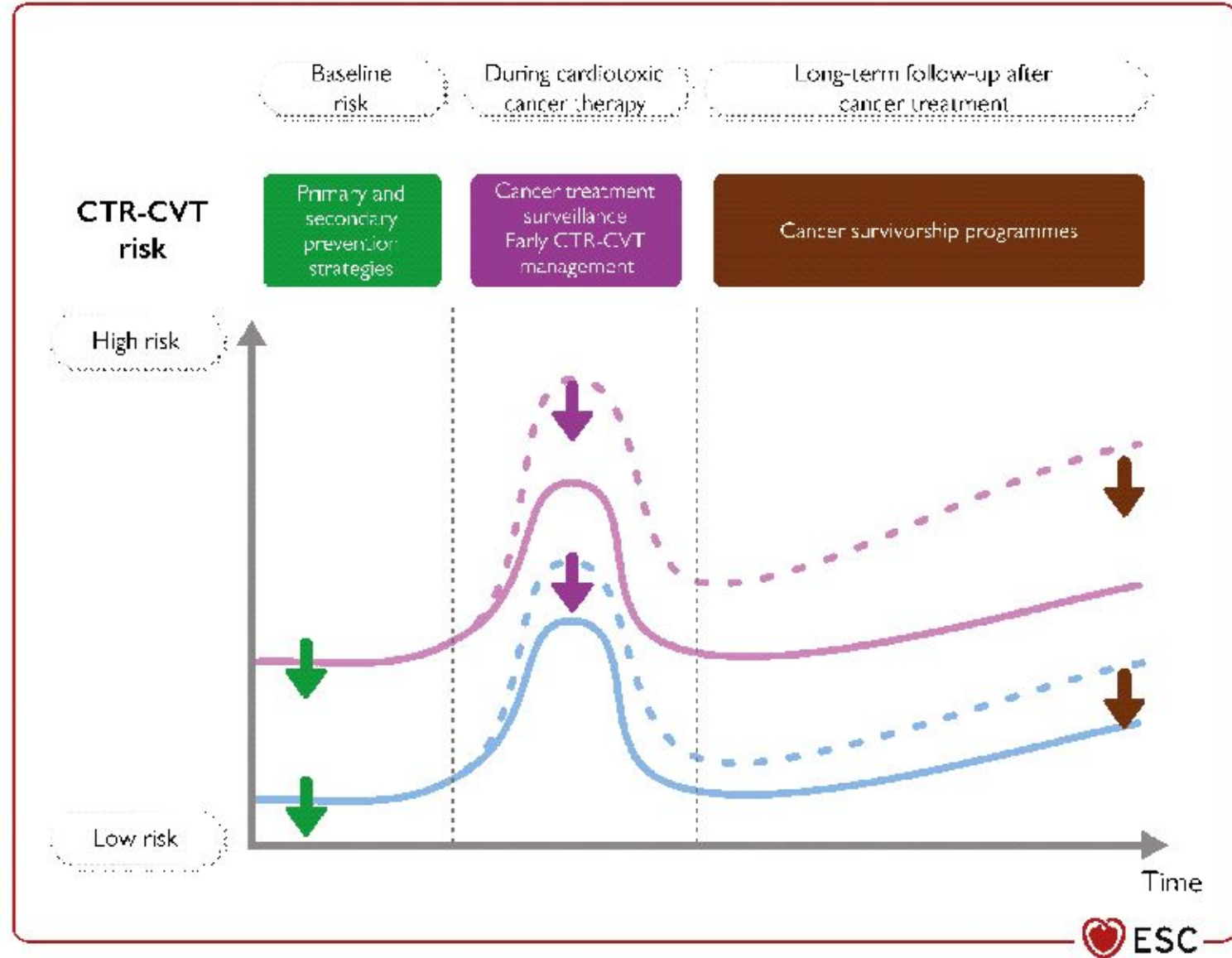




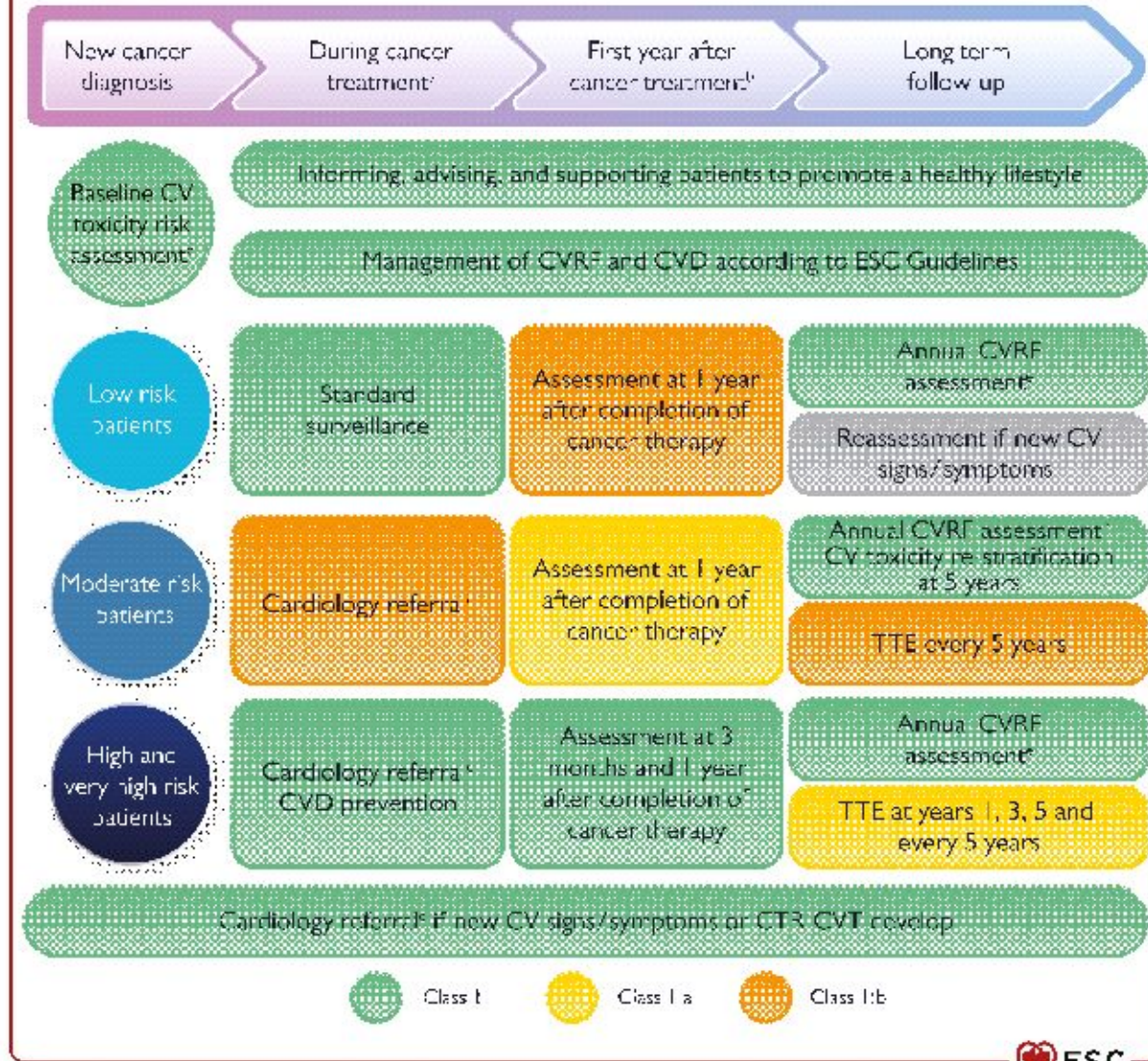


	Definition	Wording to use
Class I	Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.	Is recommended or is indicated
Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class 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

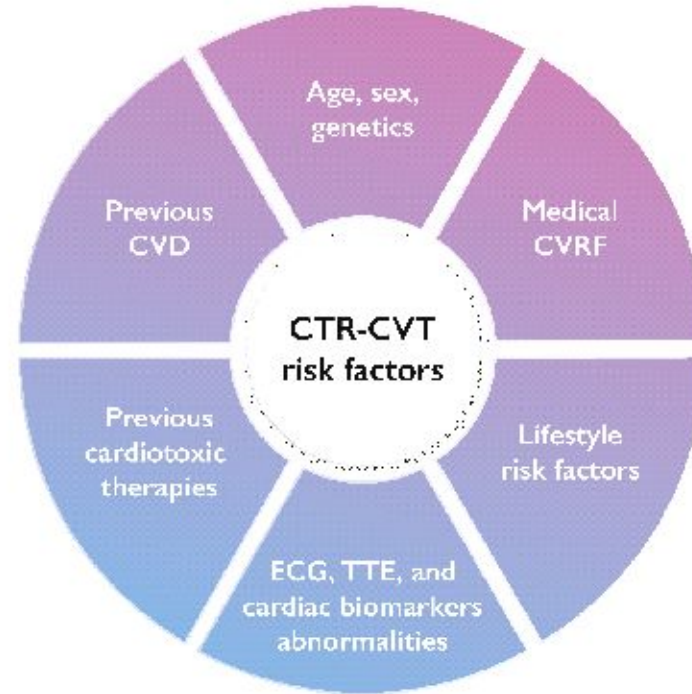
Level of evidence A	Data derived from multiple randomized clinical trials or meta-analyses.
Level of evidence B	Data derived from a single randomized clinical trial or large non-randomized studies.
Level of evidence C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.



Cardio-Oncology Care Pathways



Baseline CV toxicity risk assessment checklist

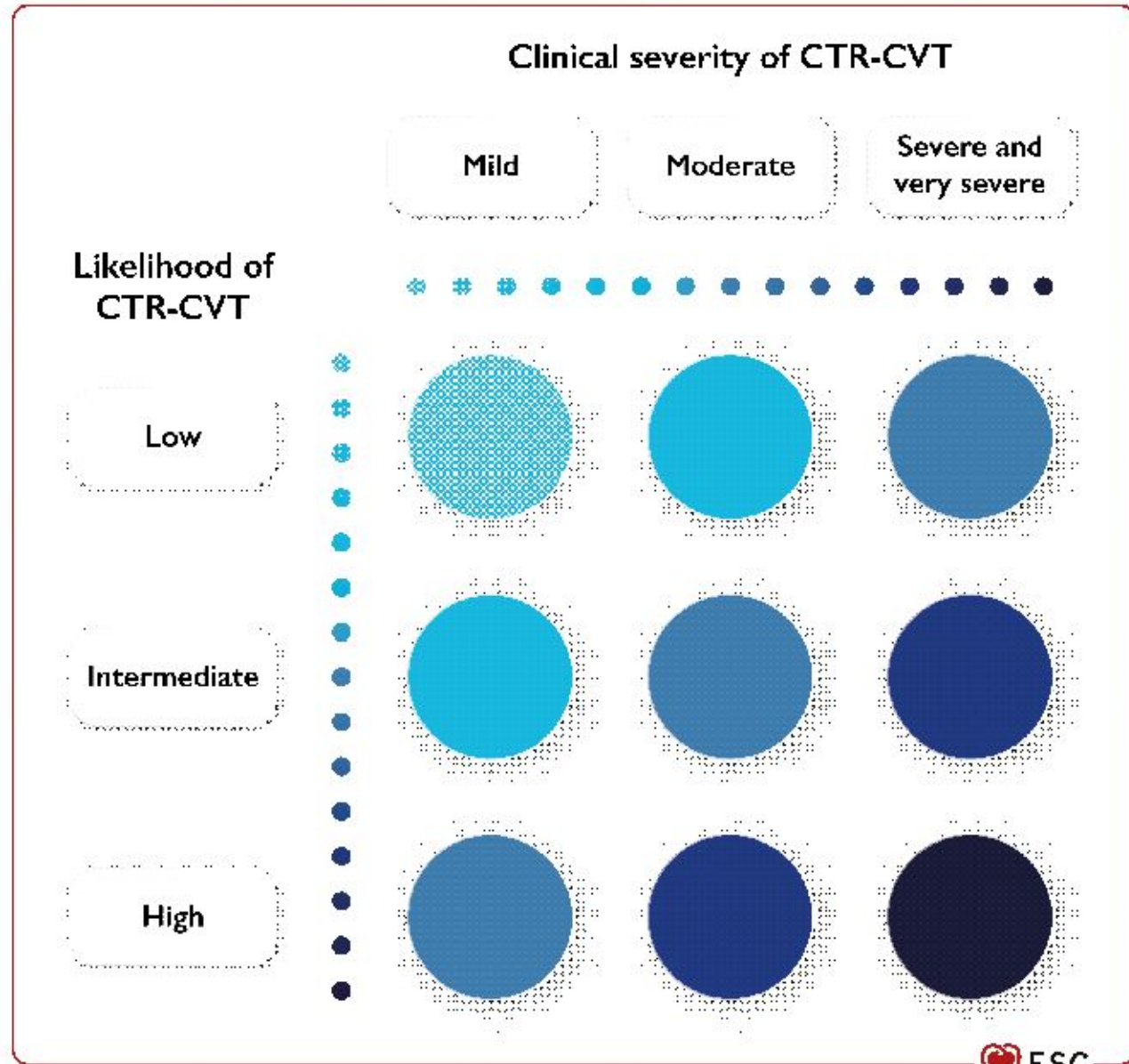


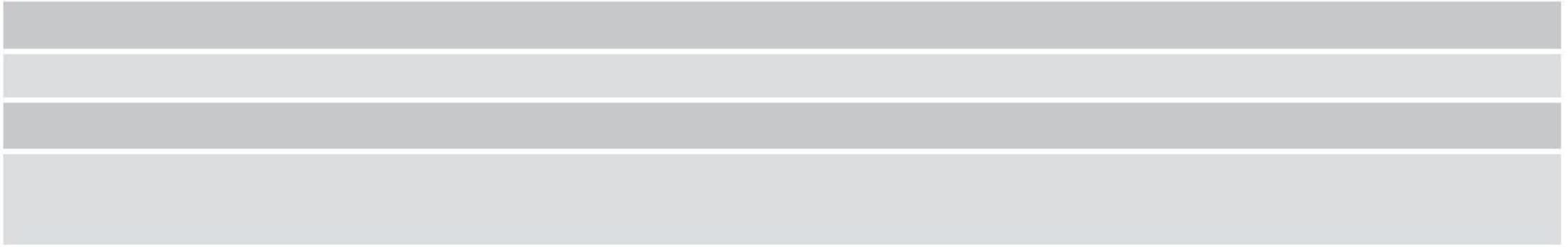
Clinical assessment

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

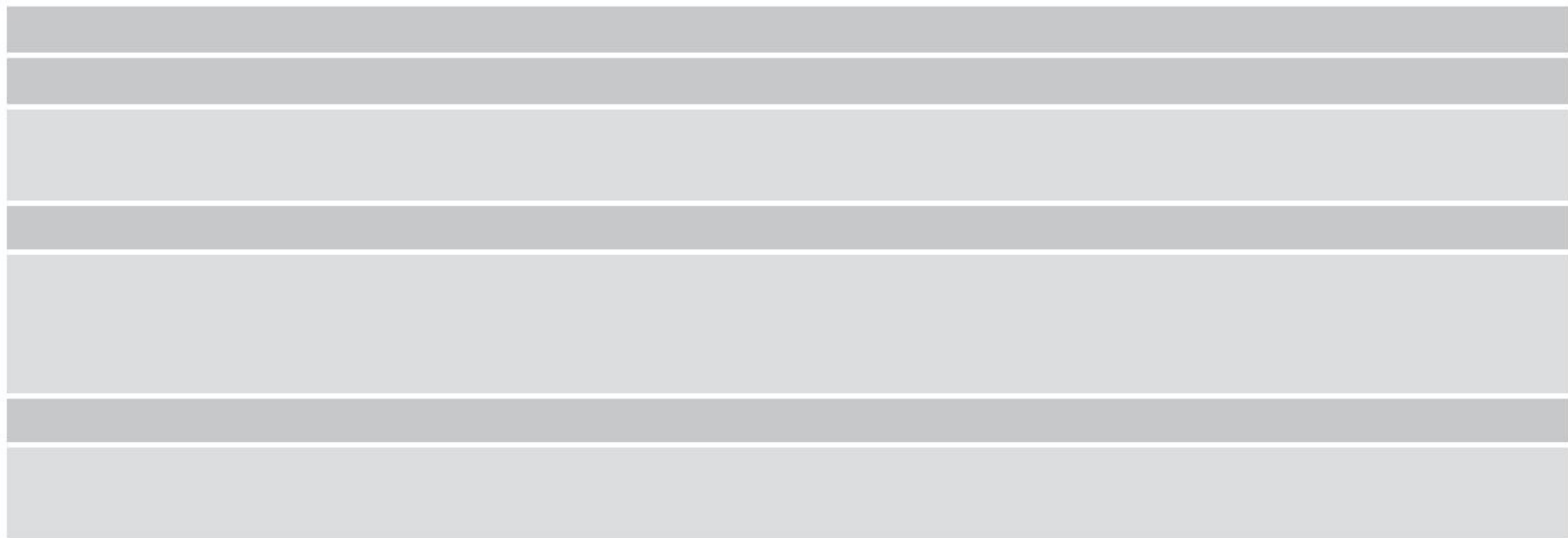
Complementary tests

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



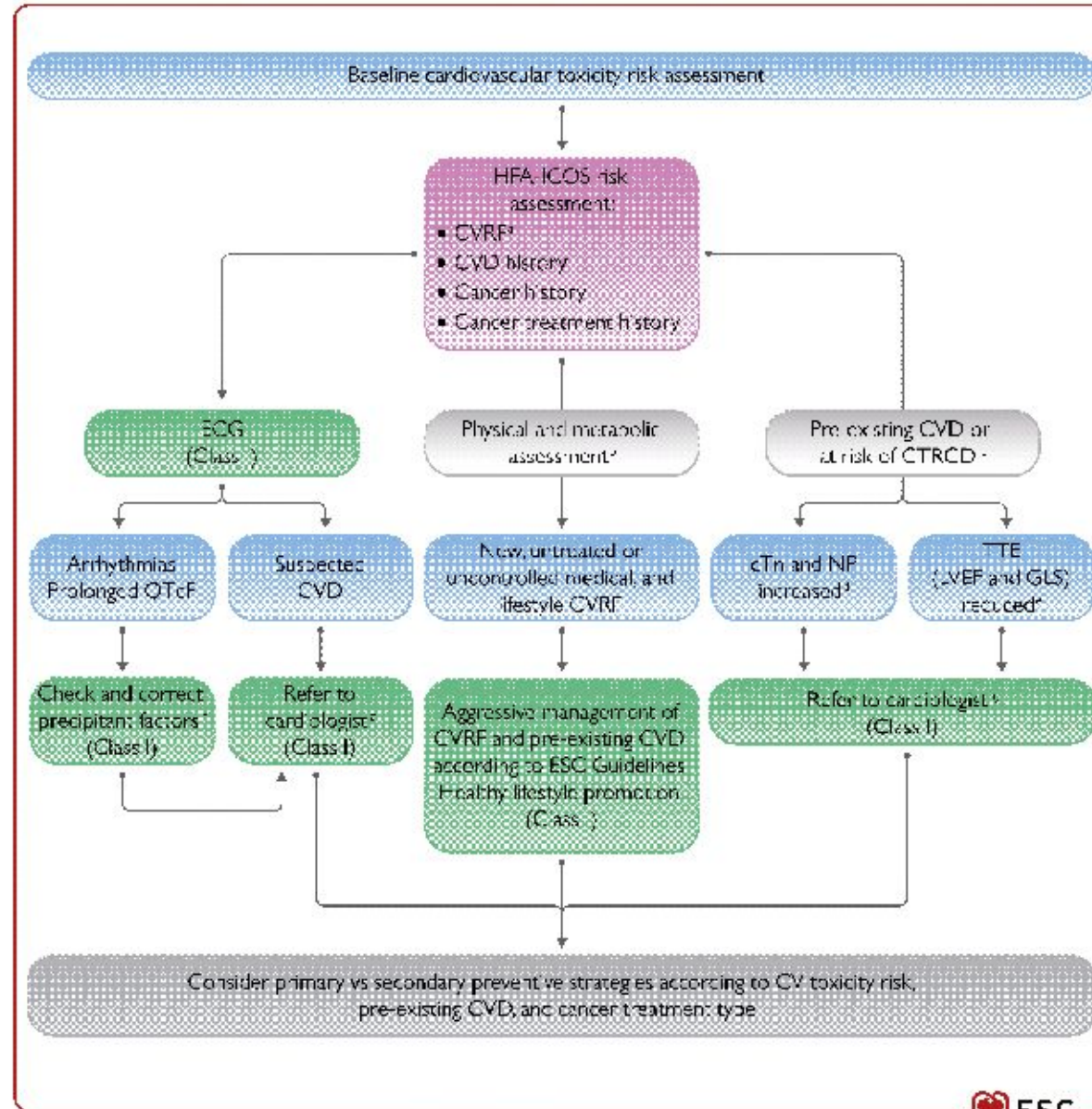


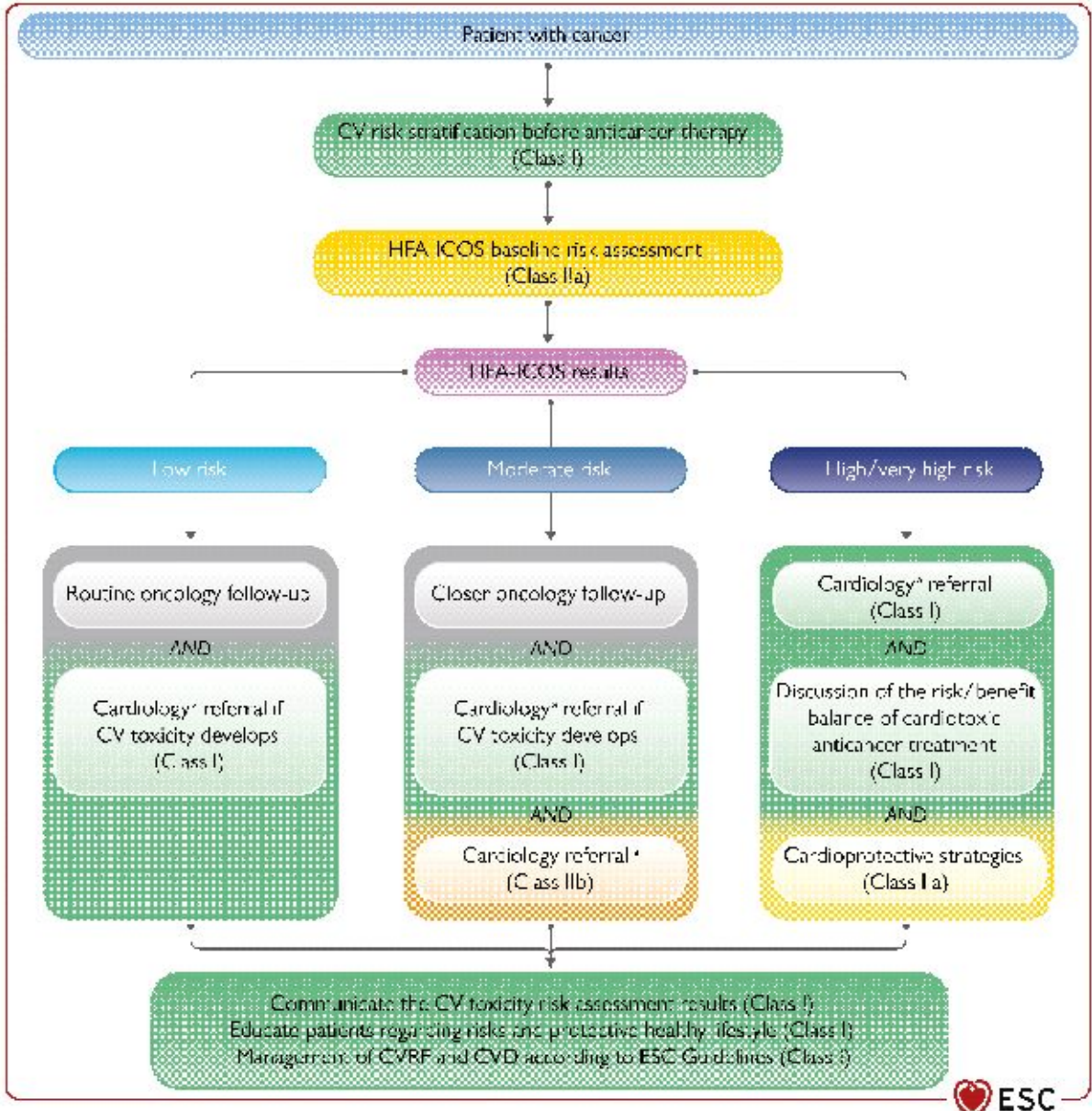












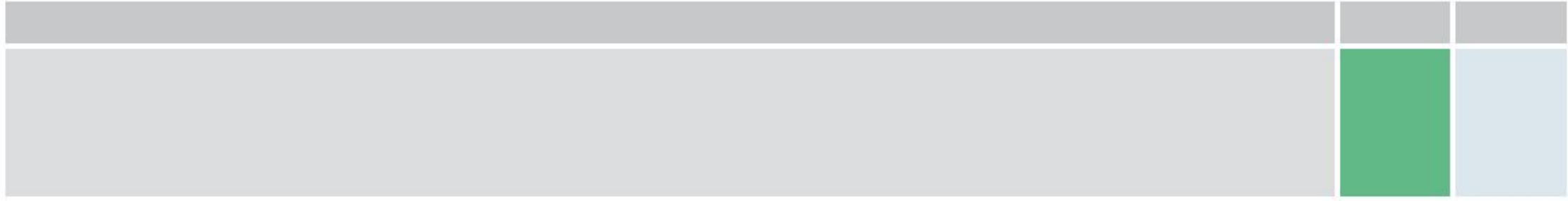
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	Green	Light Blue

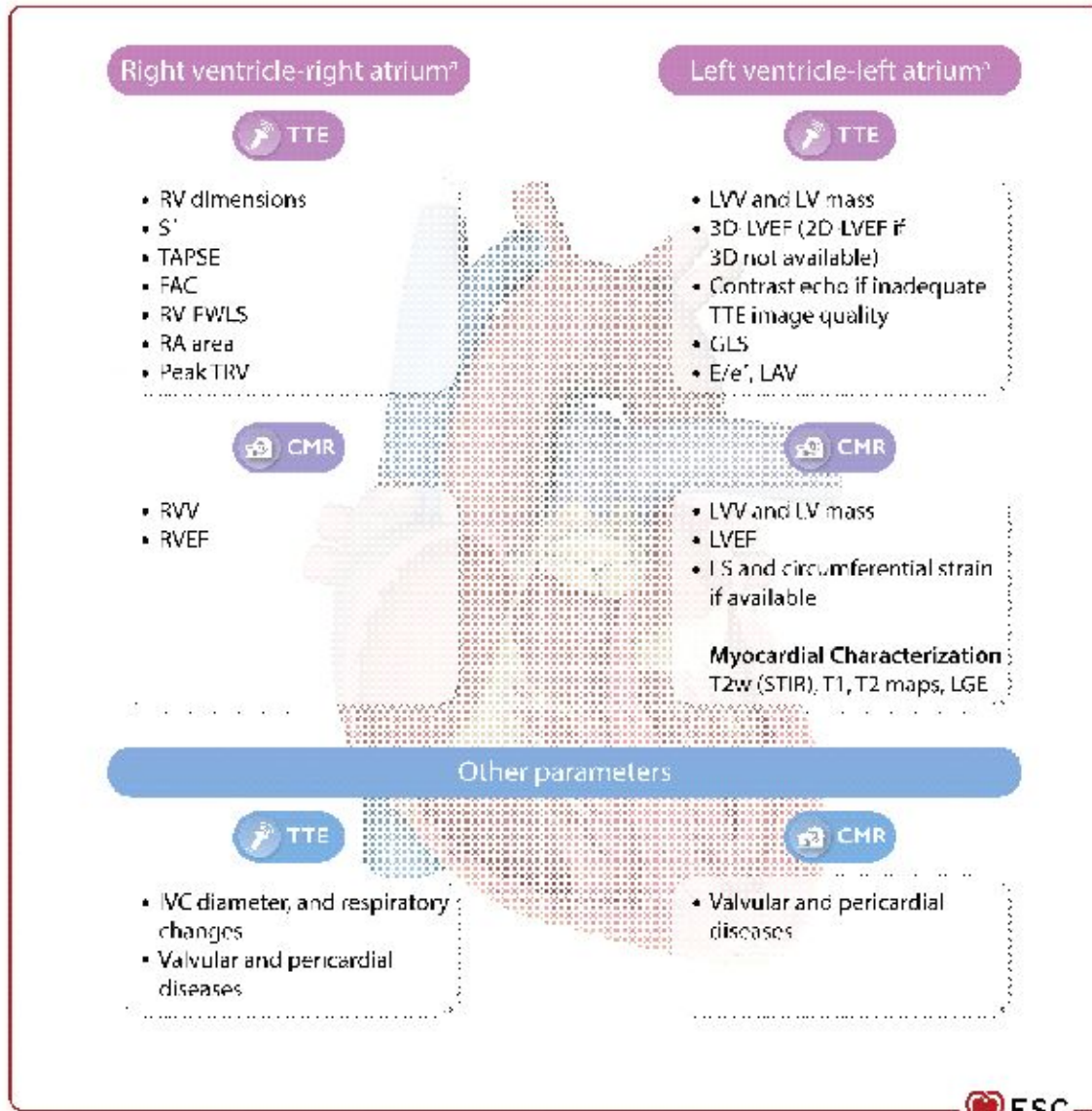
Baseline clinical CV assessment (physical exam and ECG) is recommended in all cancer patients scheduled for cytotoxic therapies.

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

Very high risk
 Moderate risk
 Low risk
 Other conditions
 Class I
 Class IIa
 Class IIb

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	Green	Blue



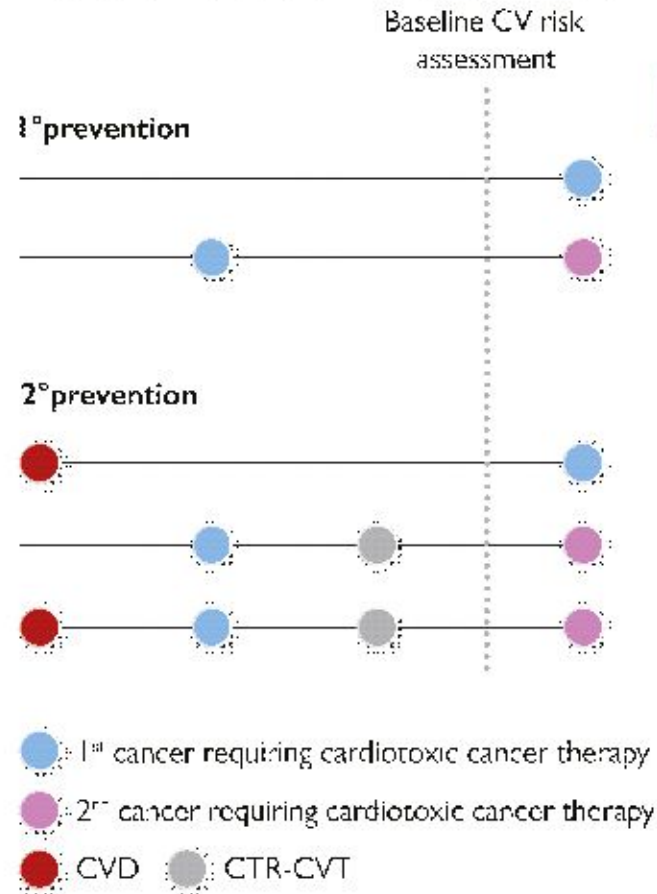


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	Orange	Light Blue
	Green	Light Blue



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



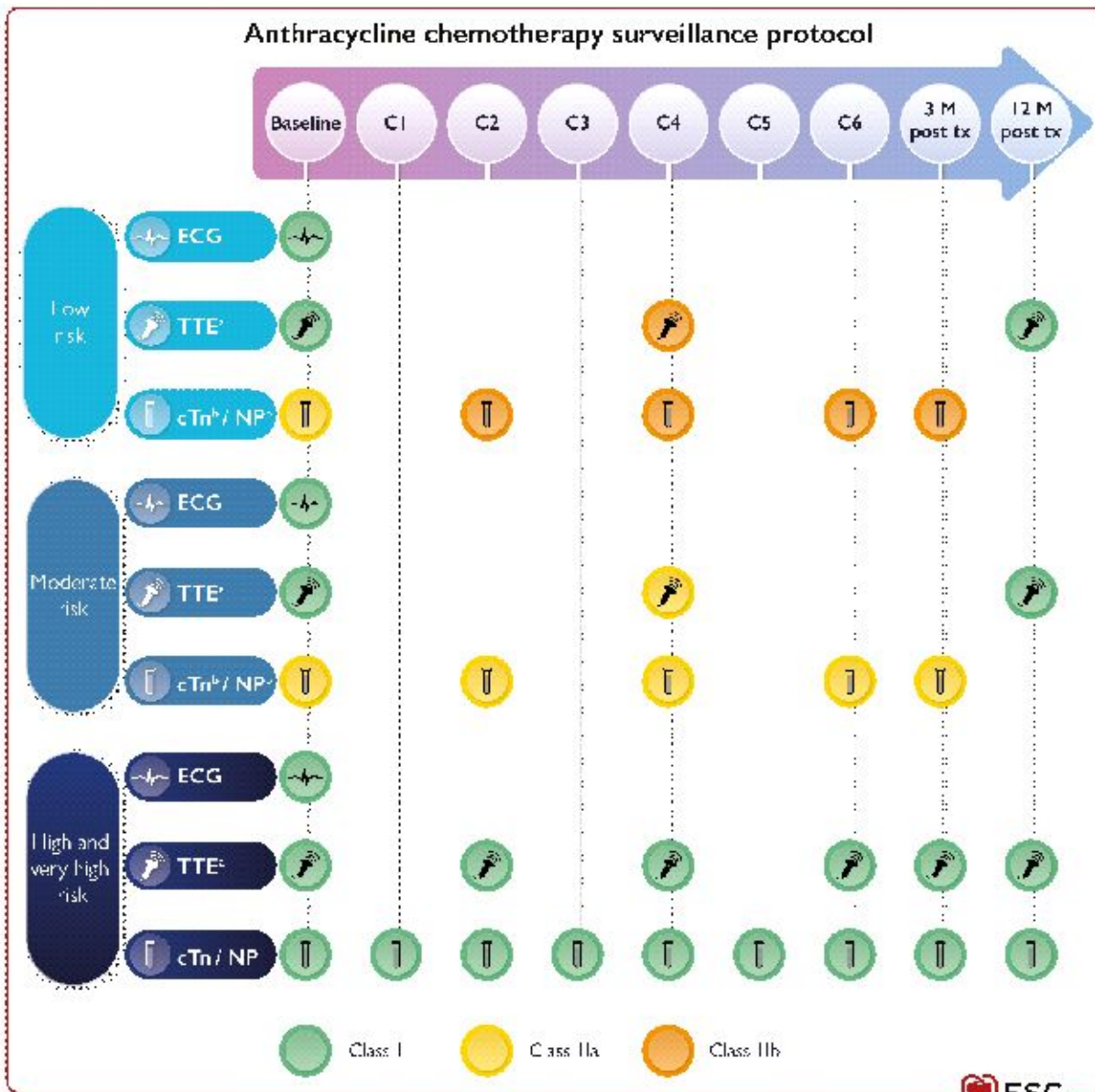
Class I



Class IIa

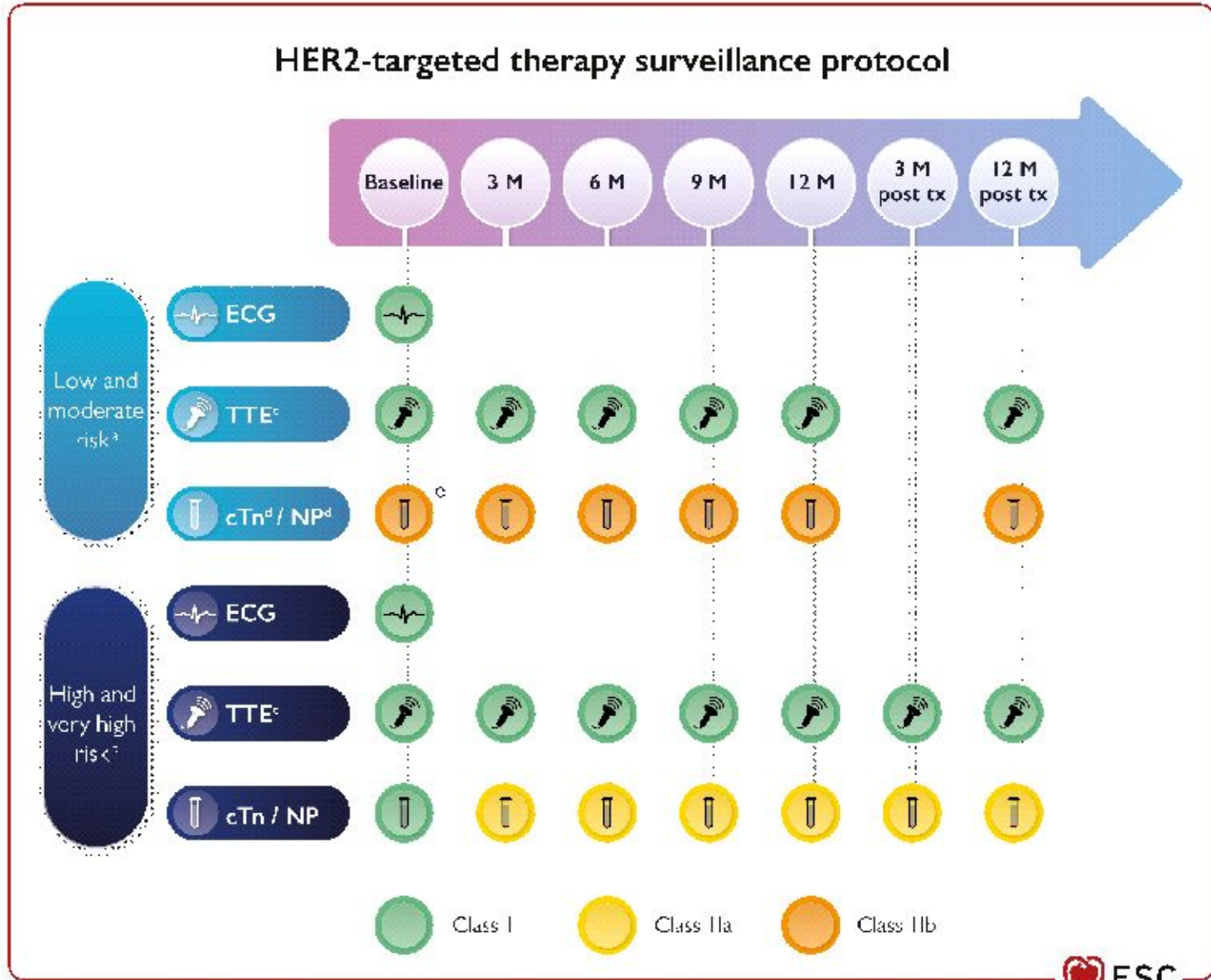


Anthracycline chemotherapy surveillance protocol



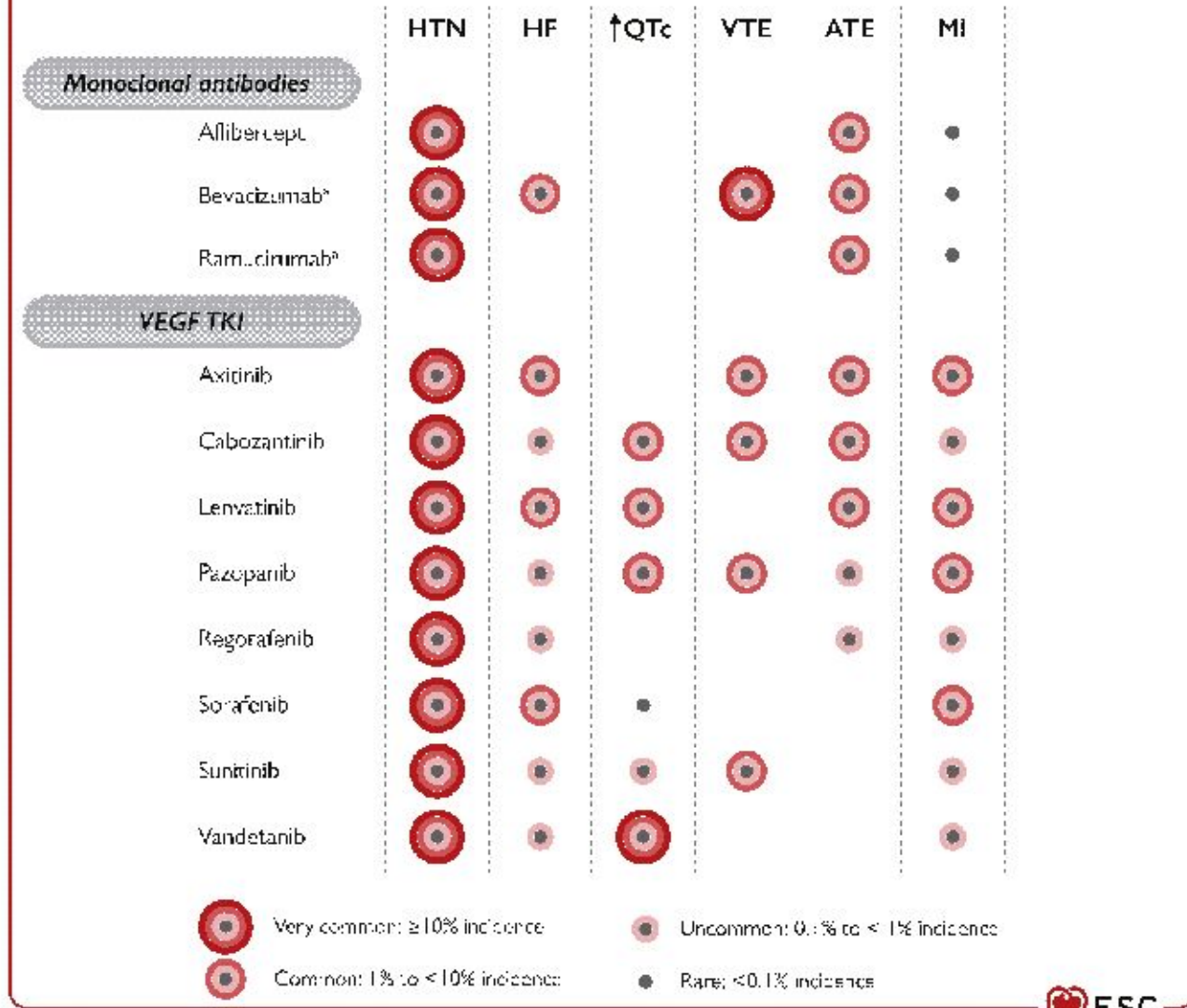


HER2-targeted therapy surveillance protocol

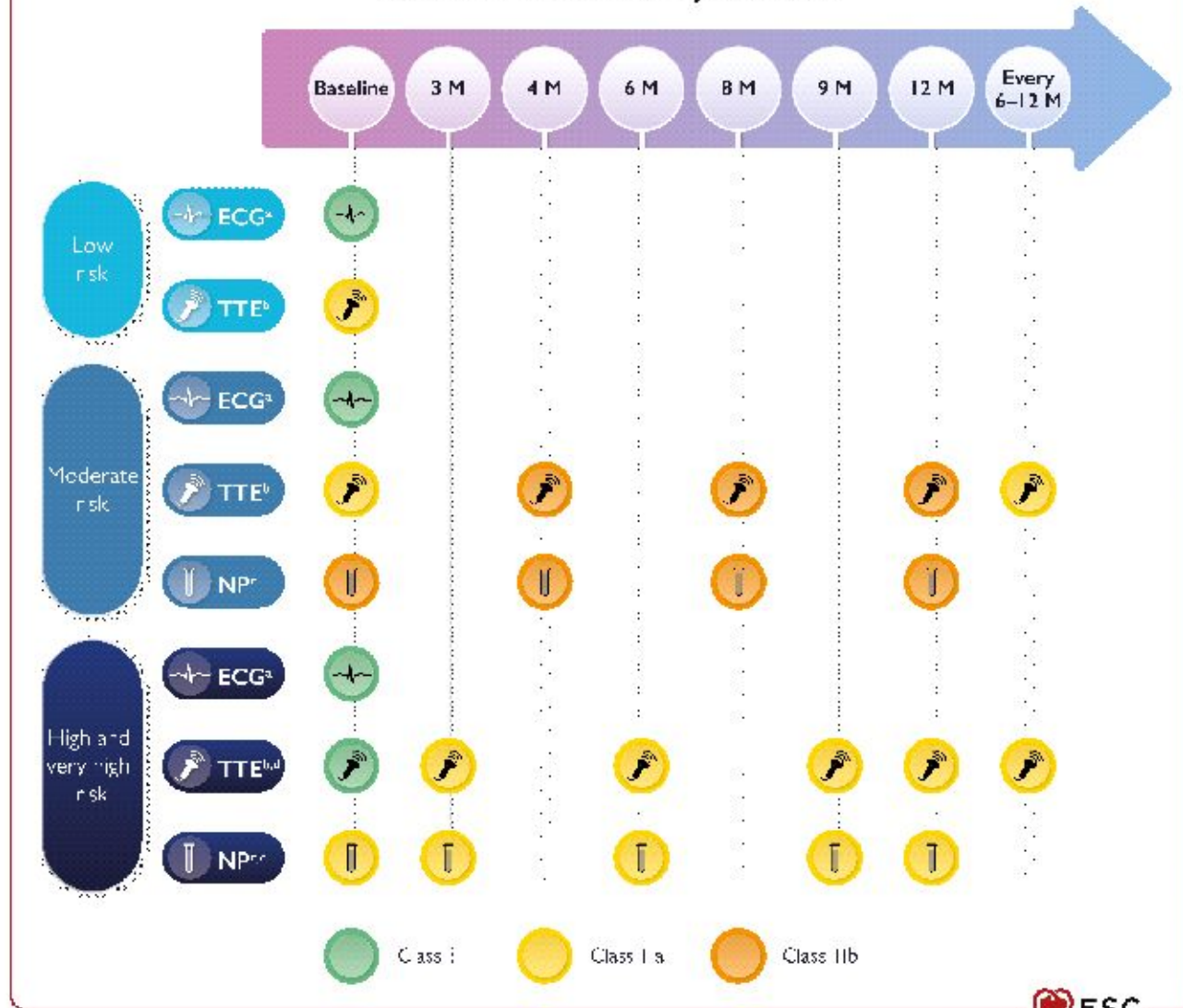


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	Yellow	Light Blue

VEGFi-related cardiovascular toxicities

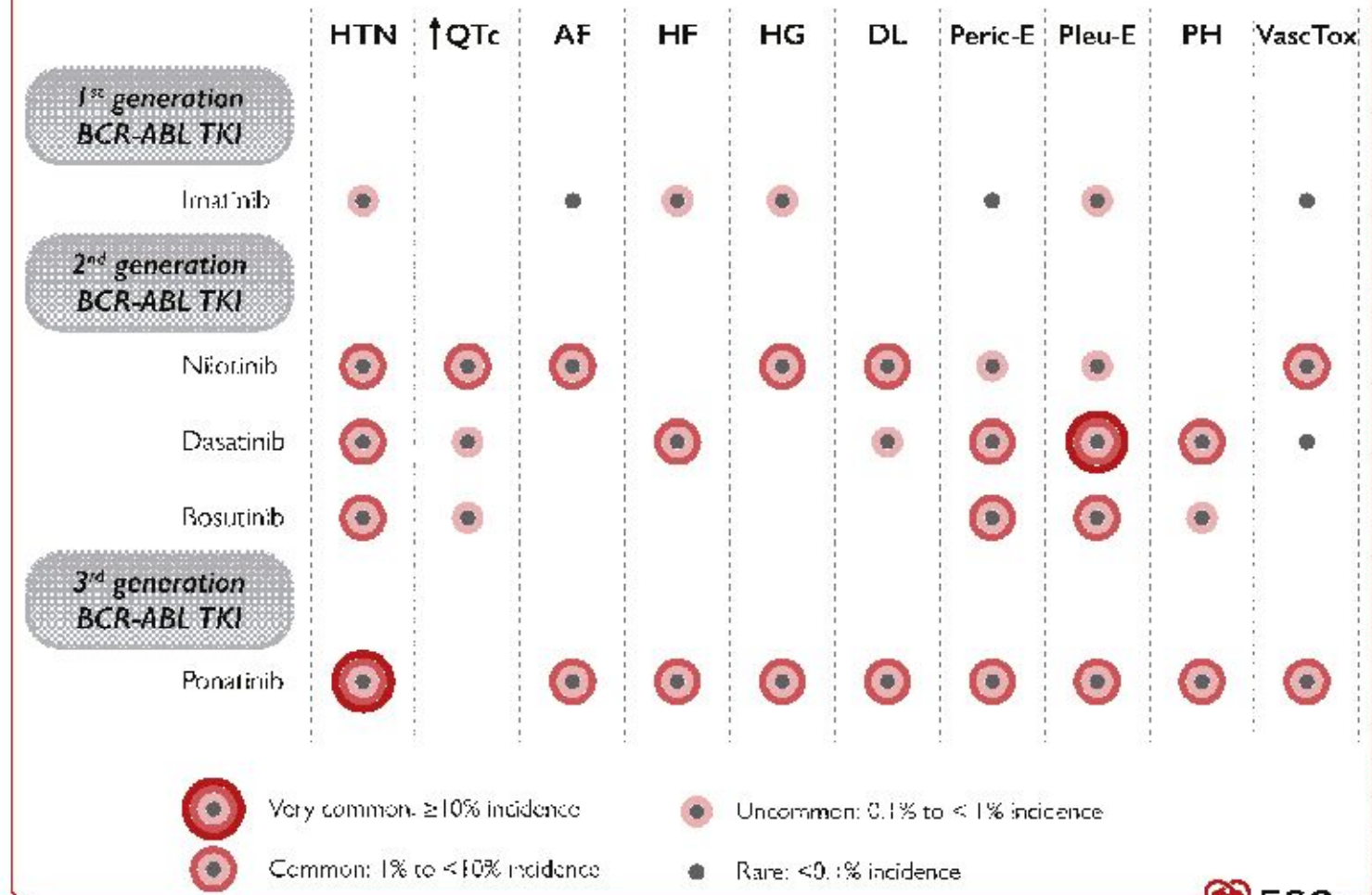


VEGFi surveillance protocol

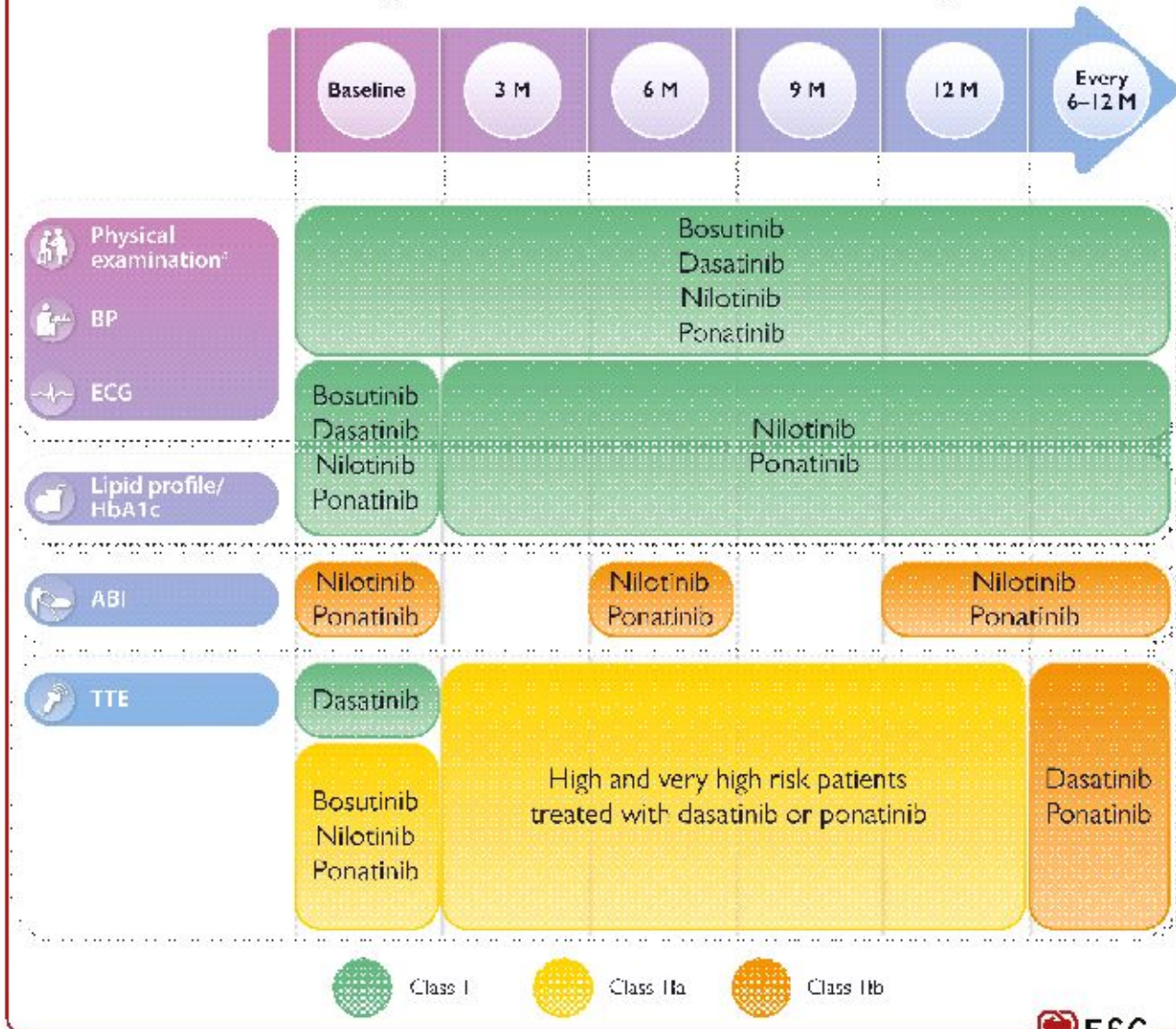




BCR-ABL TKI-related cardiovascular toxicities

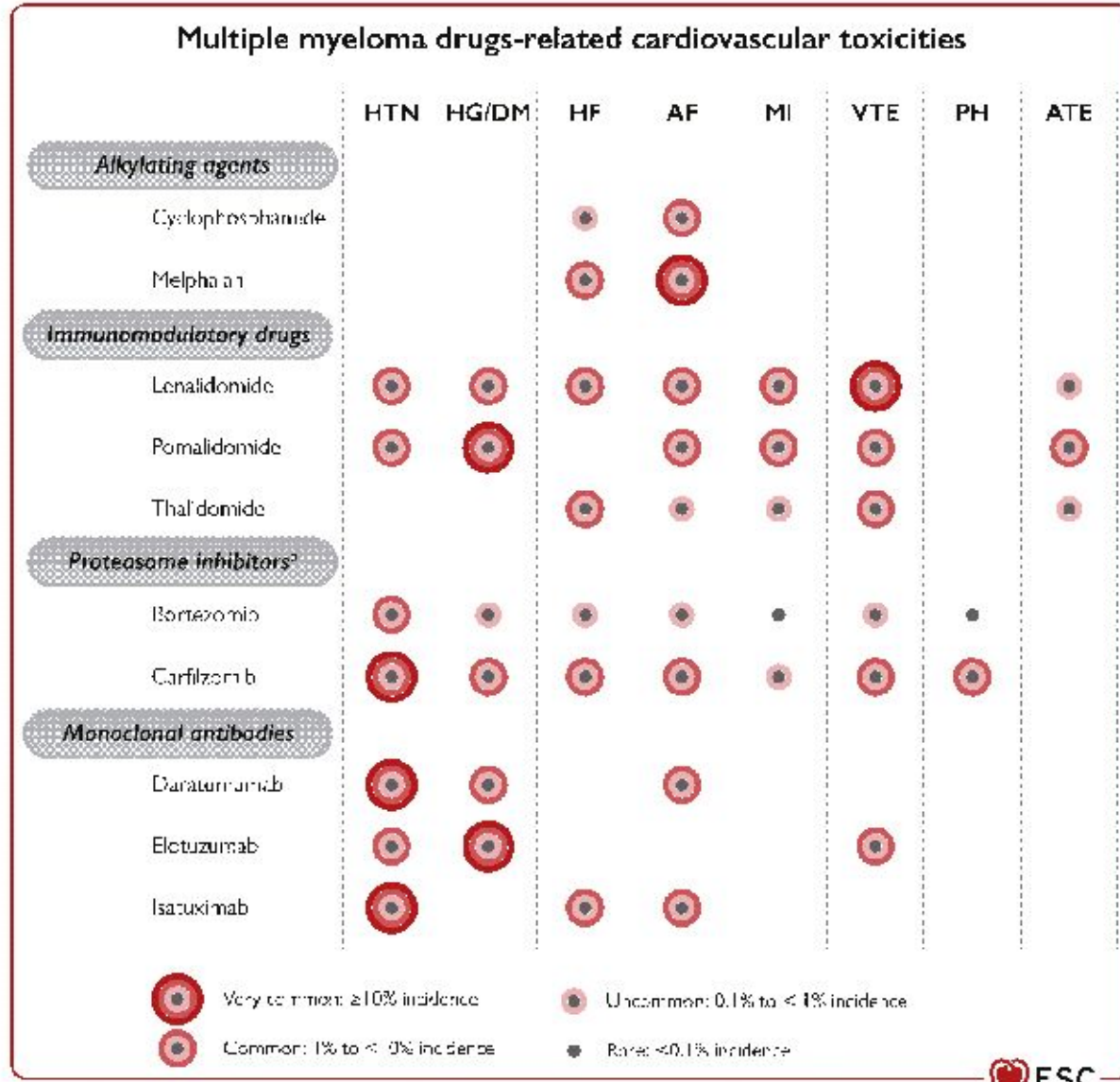


Second and third generation BCR-ABL TKI surveillance protocol

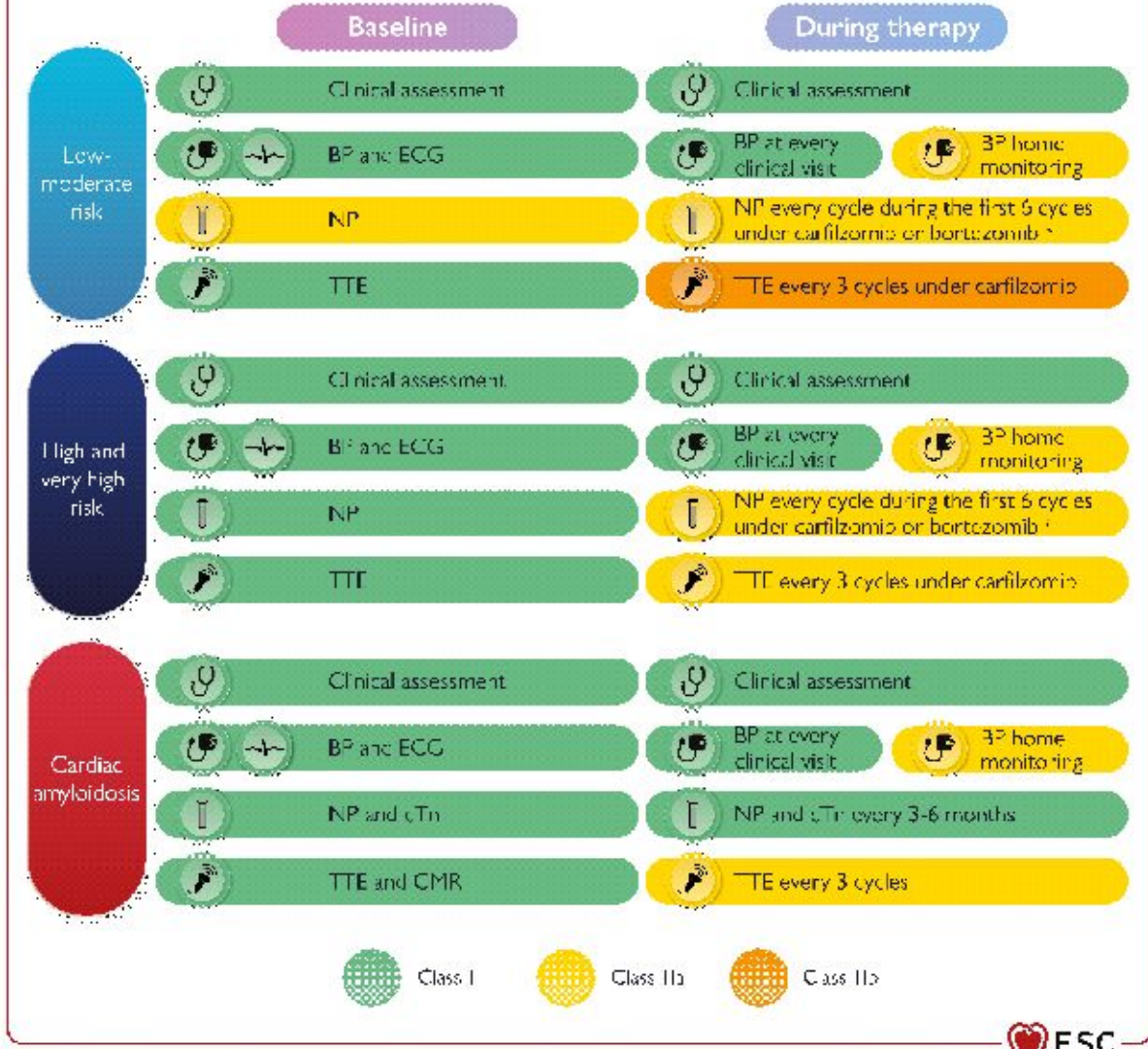


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	Orange	Light Blue
	Orange	Light Blue





Proteasome inhibitors surveillance protocol



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	Yellow	Light Blue
	Yellow	Blue
	Green	Blue

Risk factors for venous thromboembolic events in patients with multiple myeloma

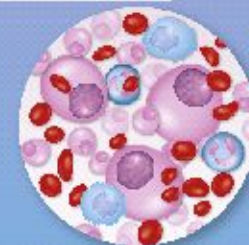
Patient-related risk factors

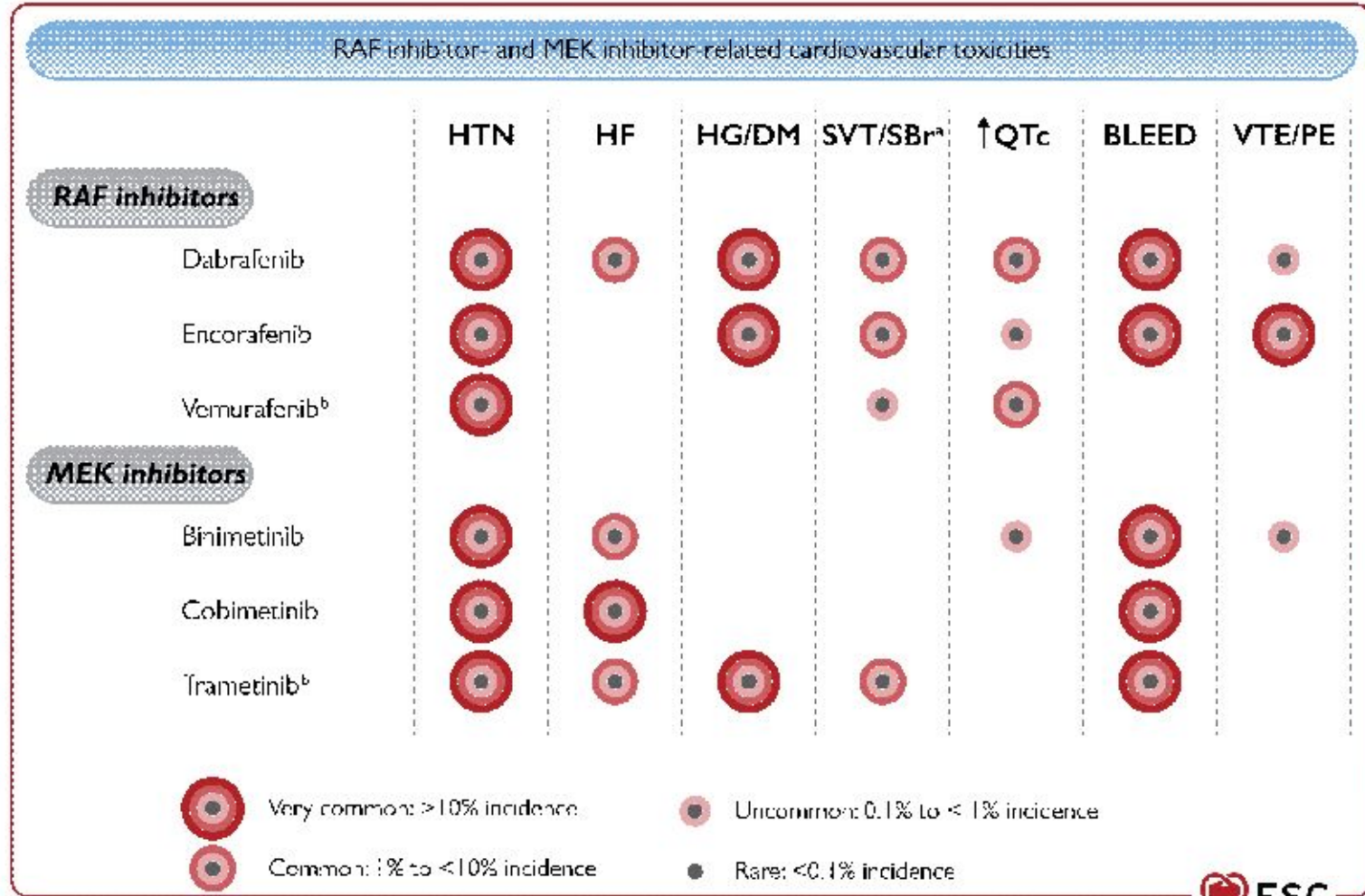
- Previous VTE
- Acute infections
- Autoimmune disease
- Central venous catheter
- Chronic renal disease
- Cigarette smoking
- CVD
- DM
- General surgery
- History of inherited thrombophilia
- Immobilization, surgery, trauma
- Obesity (BMI >30 kg/m²)



Myeloma-related risk factors

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

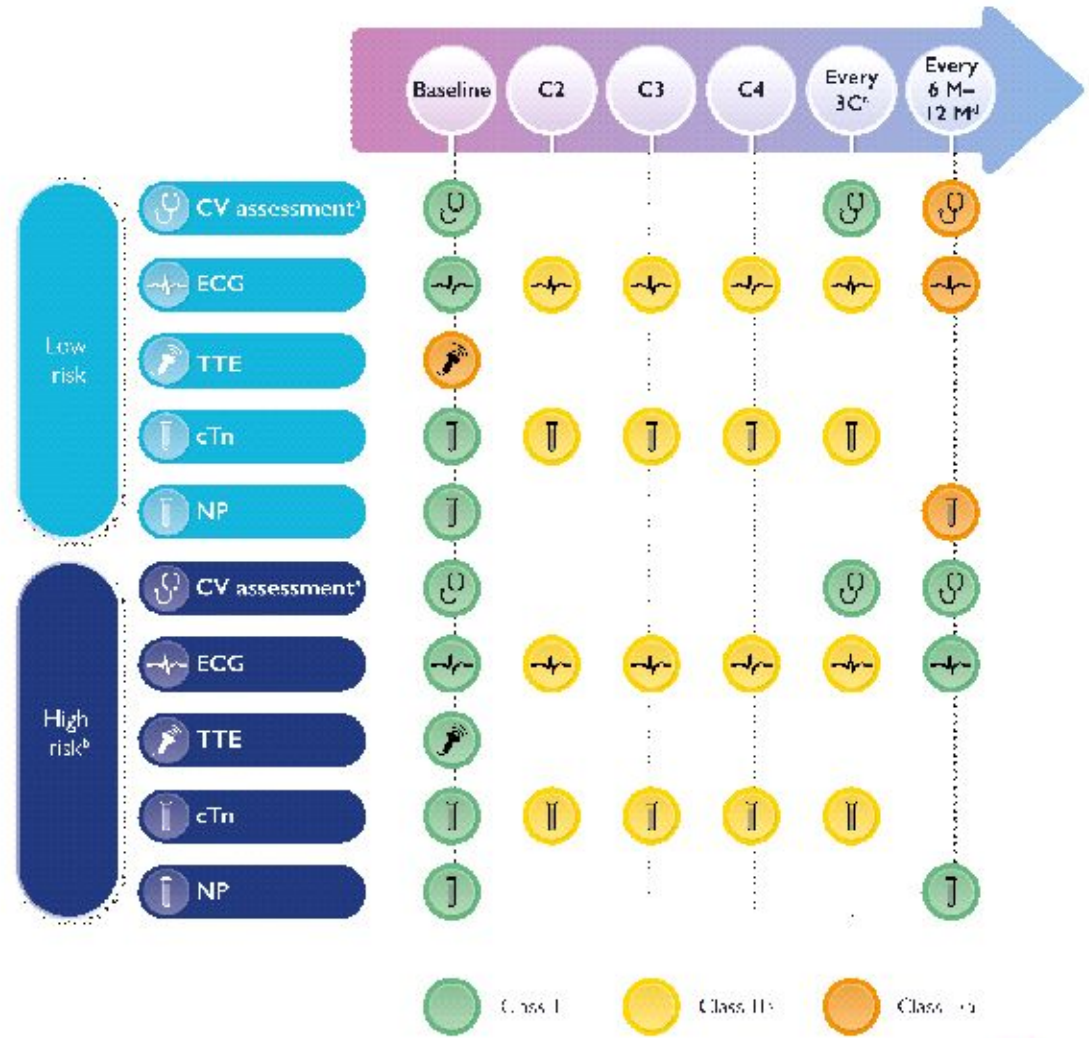




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	Yellow	Light Blue






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	Orange	Light Blue
	Yellow	Blue
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	Orange	Light Blue

Immune checkpoint inhibitors surveillance protocol

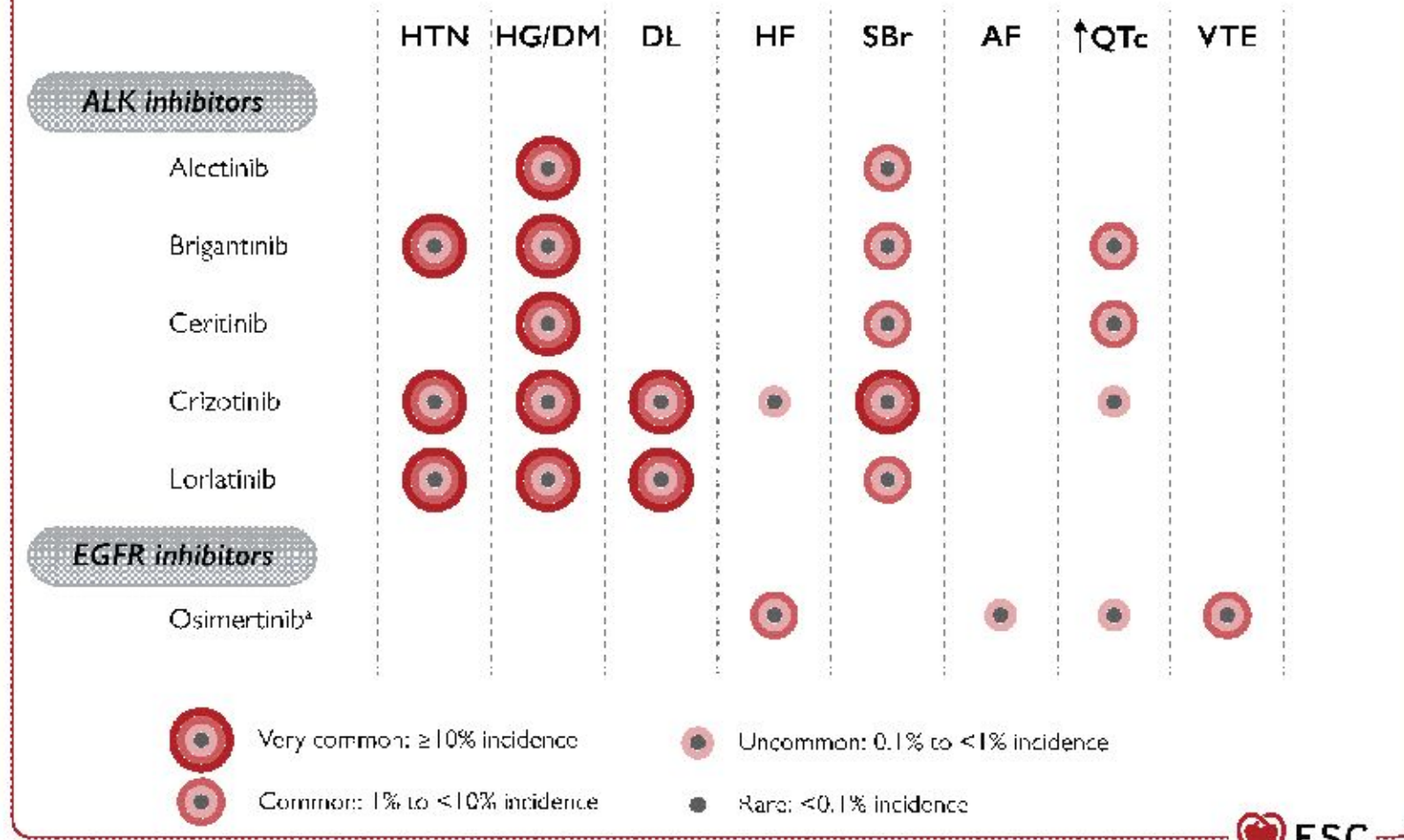


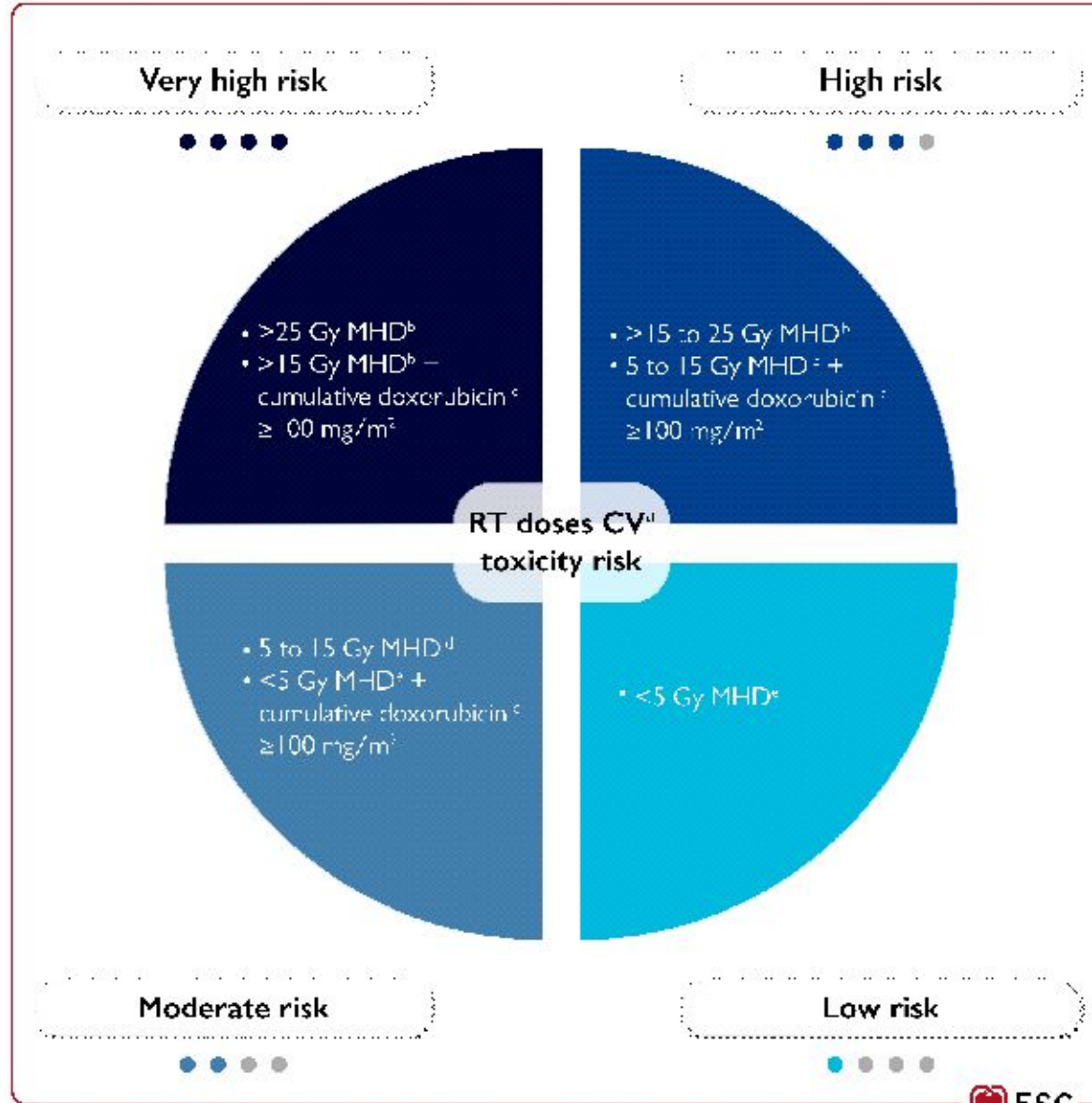
Androgen deprivation therapy-related cardiovascular toxicities

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

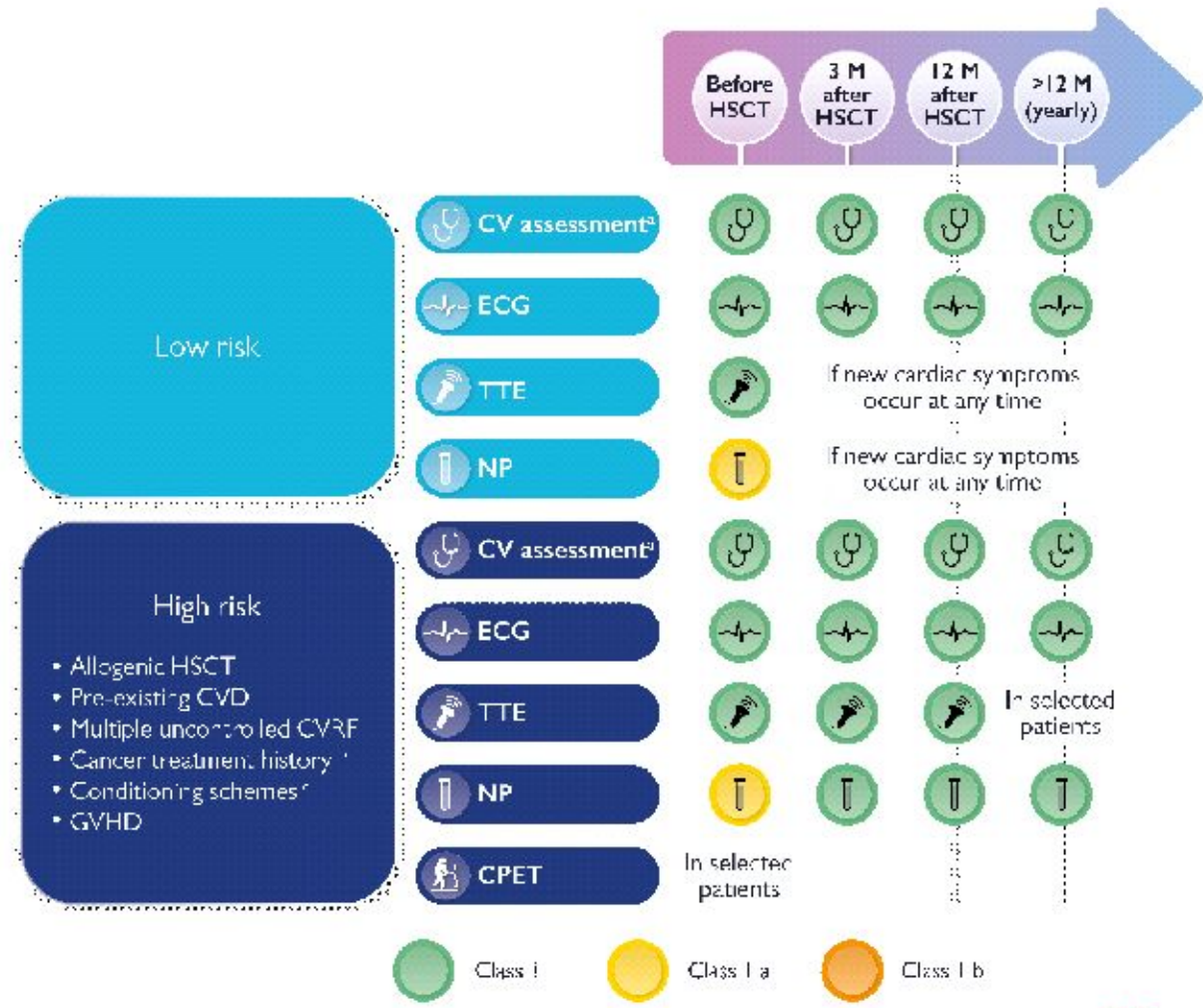
 Very common: ≥ 10% incidence
  Common: ≥ 1% to < 10% incidence
 Common: 1% to < 10% incidence
  Rare: < 1% incidence
 Rare: < 0.1% incidence

ALK inhibitor- and EGFR inhibitor-related cardiovascular toxicities

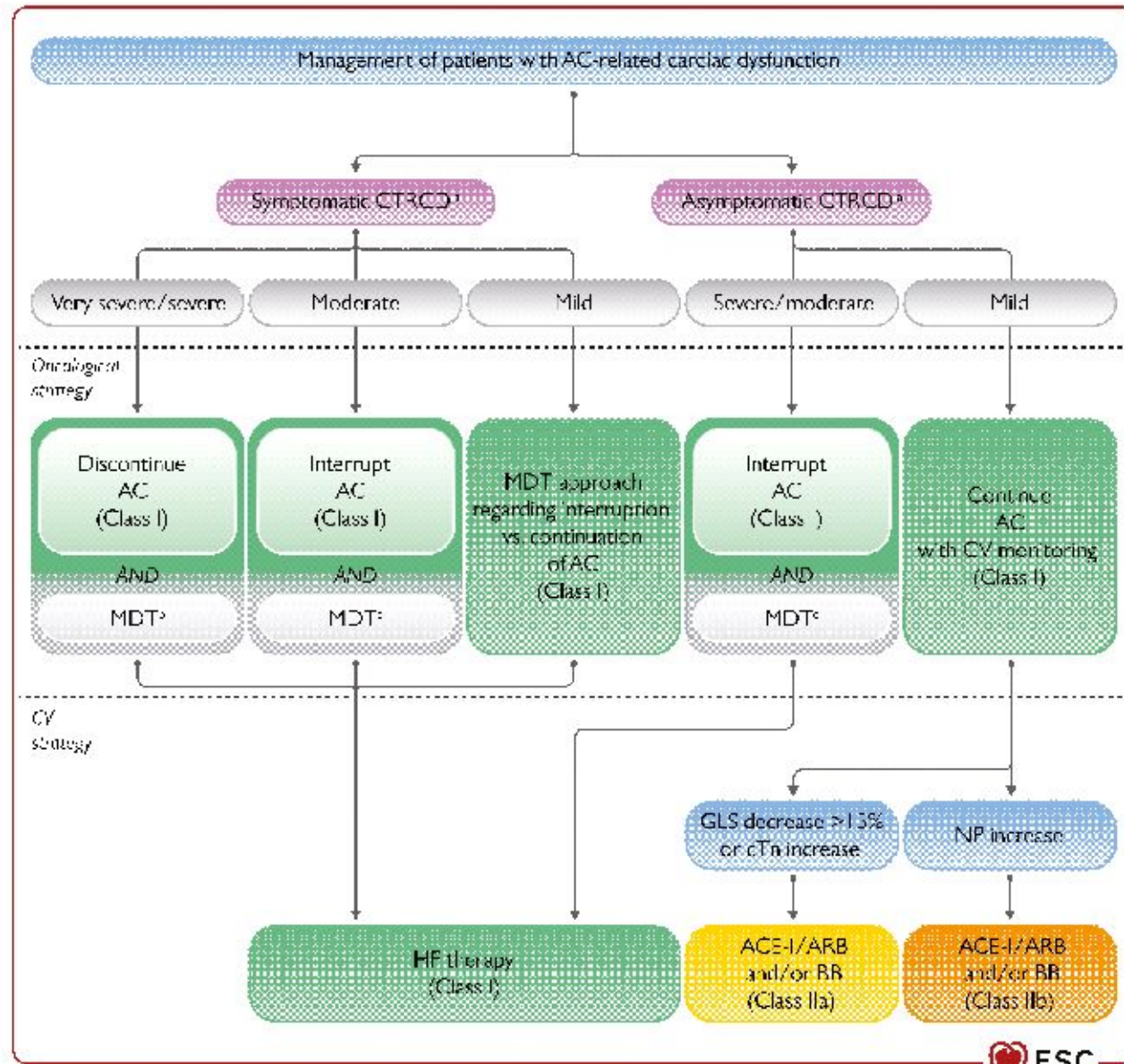




Cardiovascular surveillance in patients referred for haematopoietic stem cell transplantation

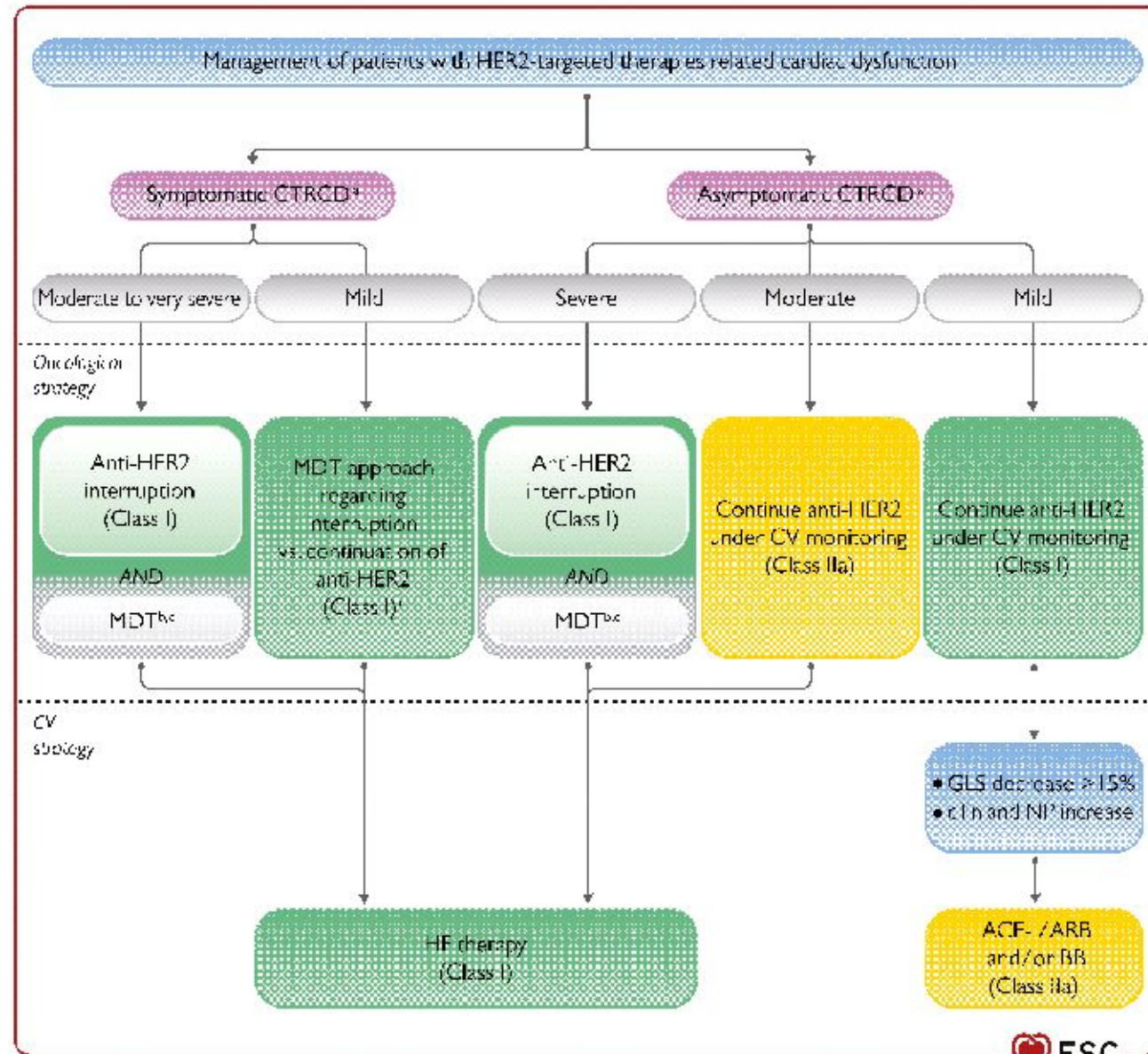


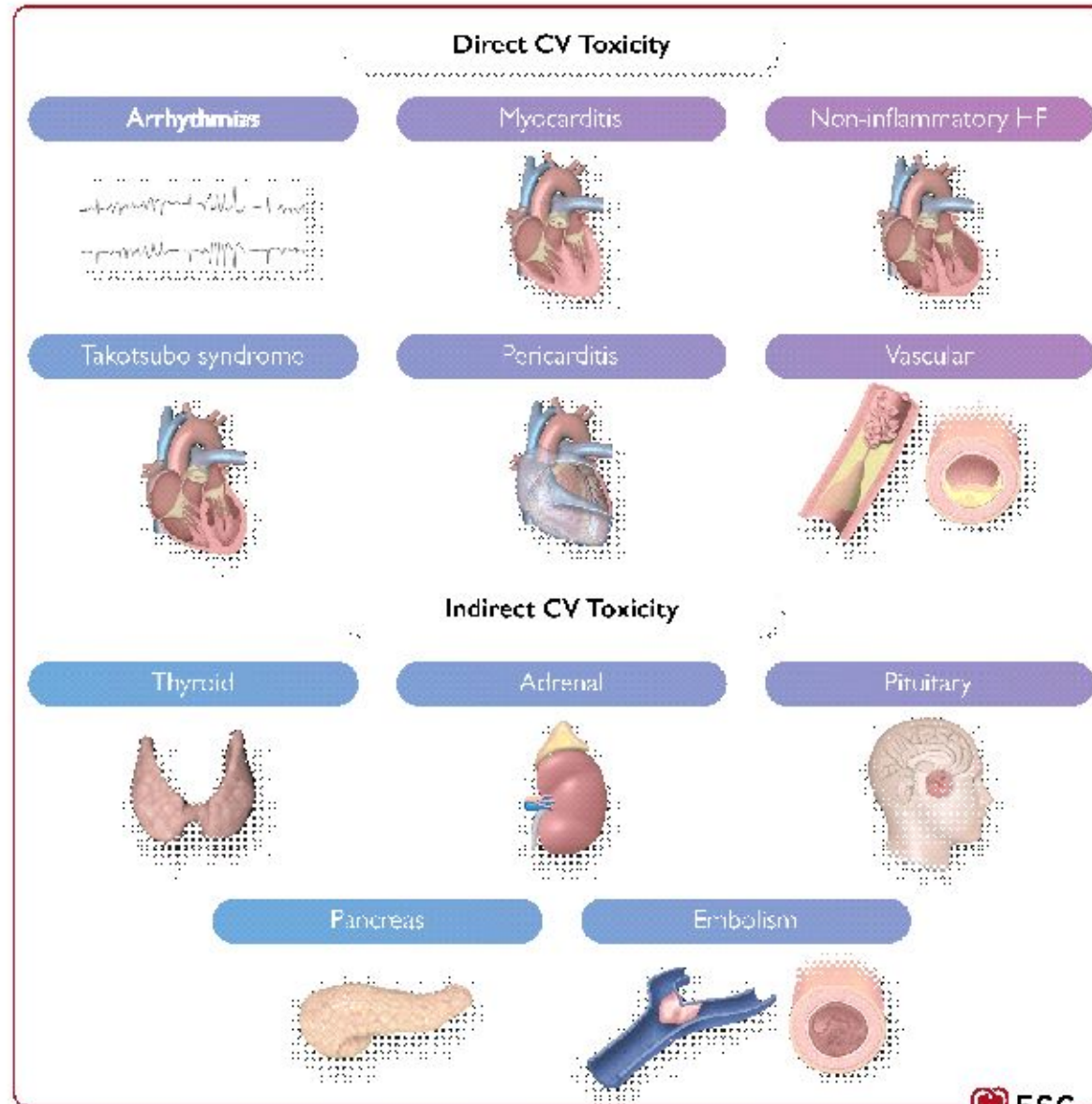


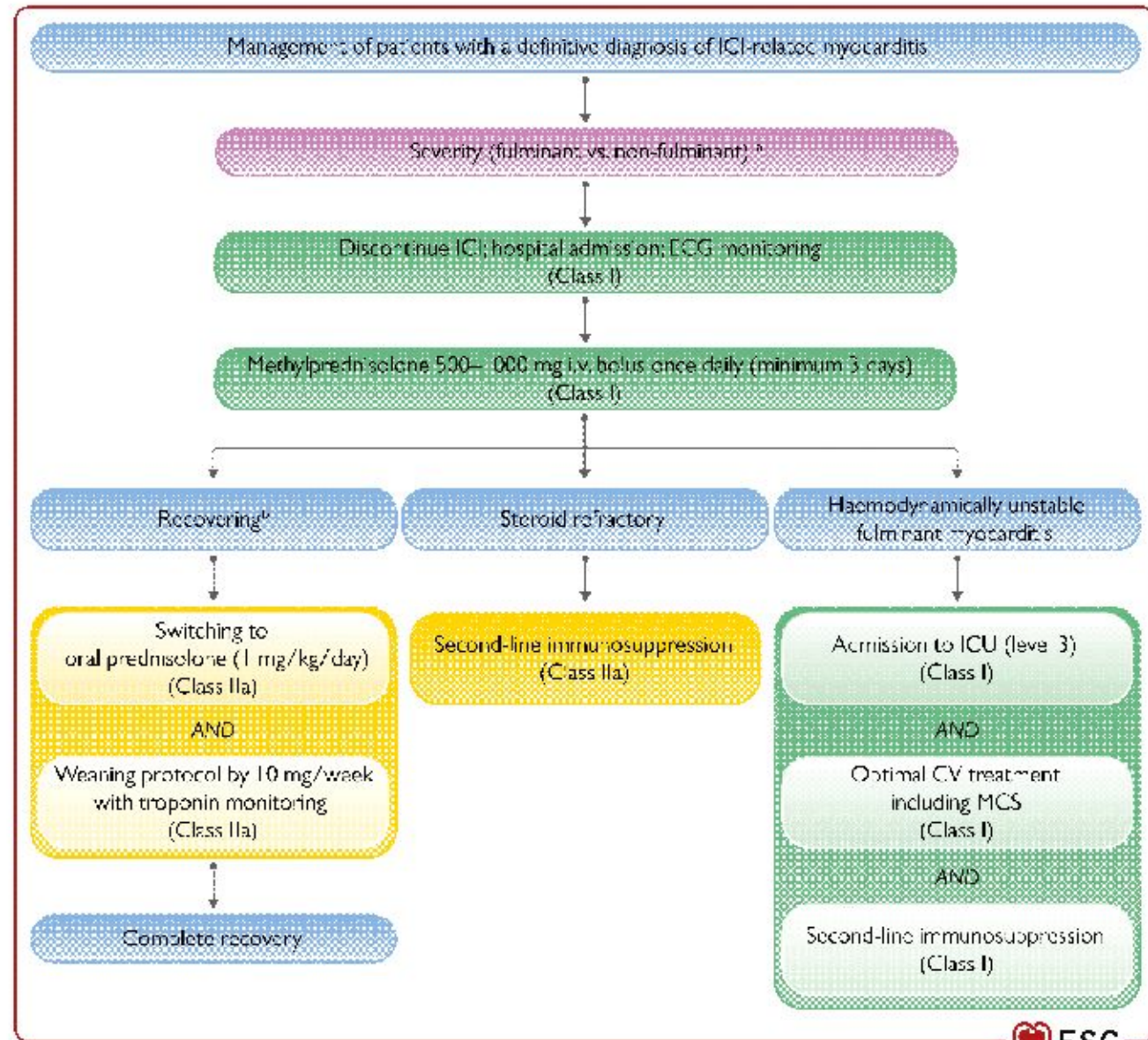


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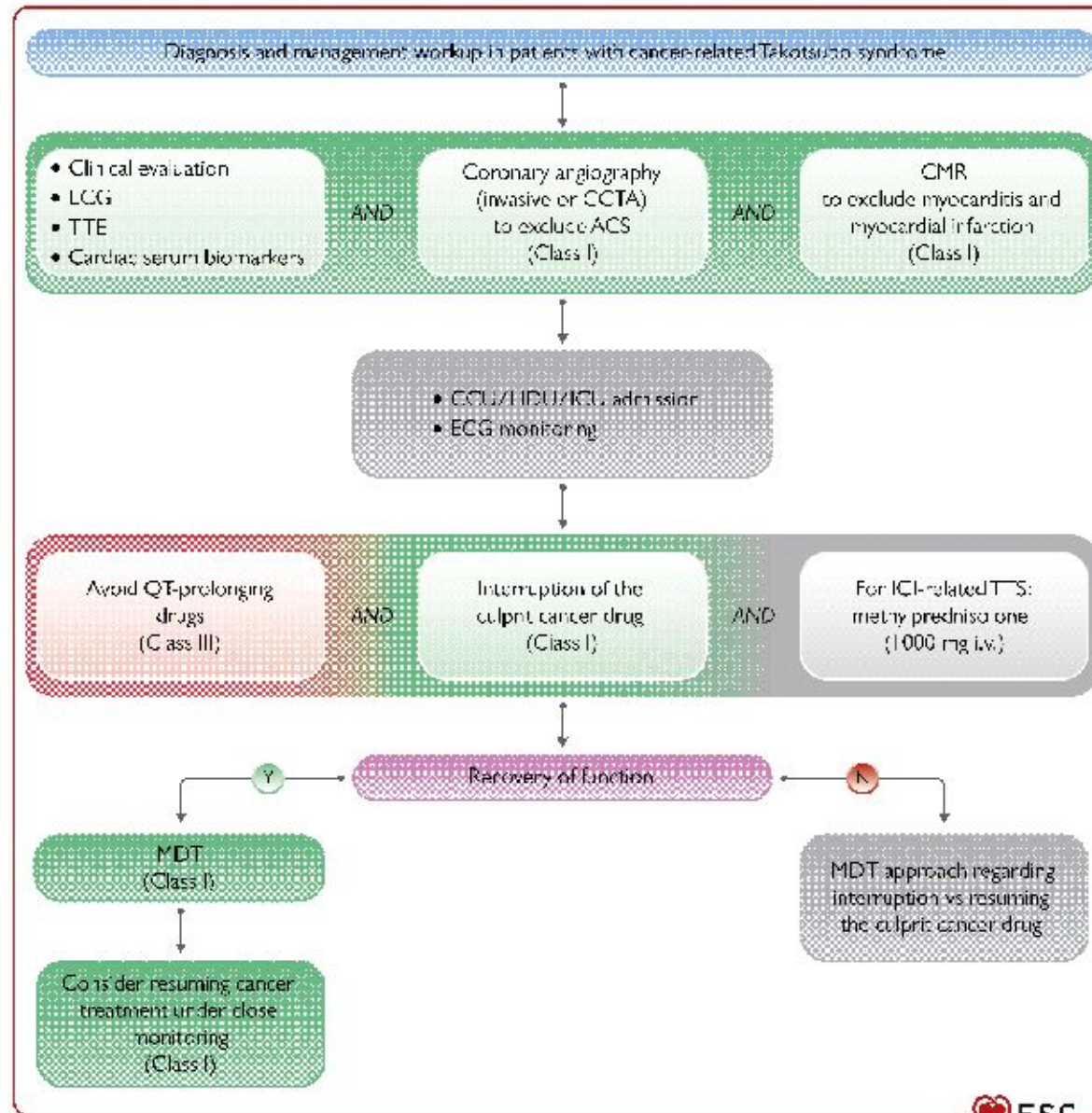






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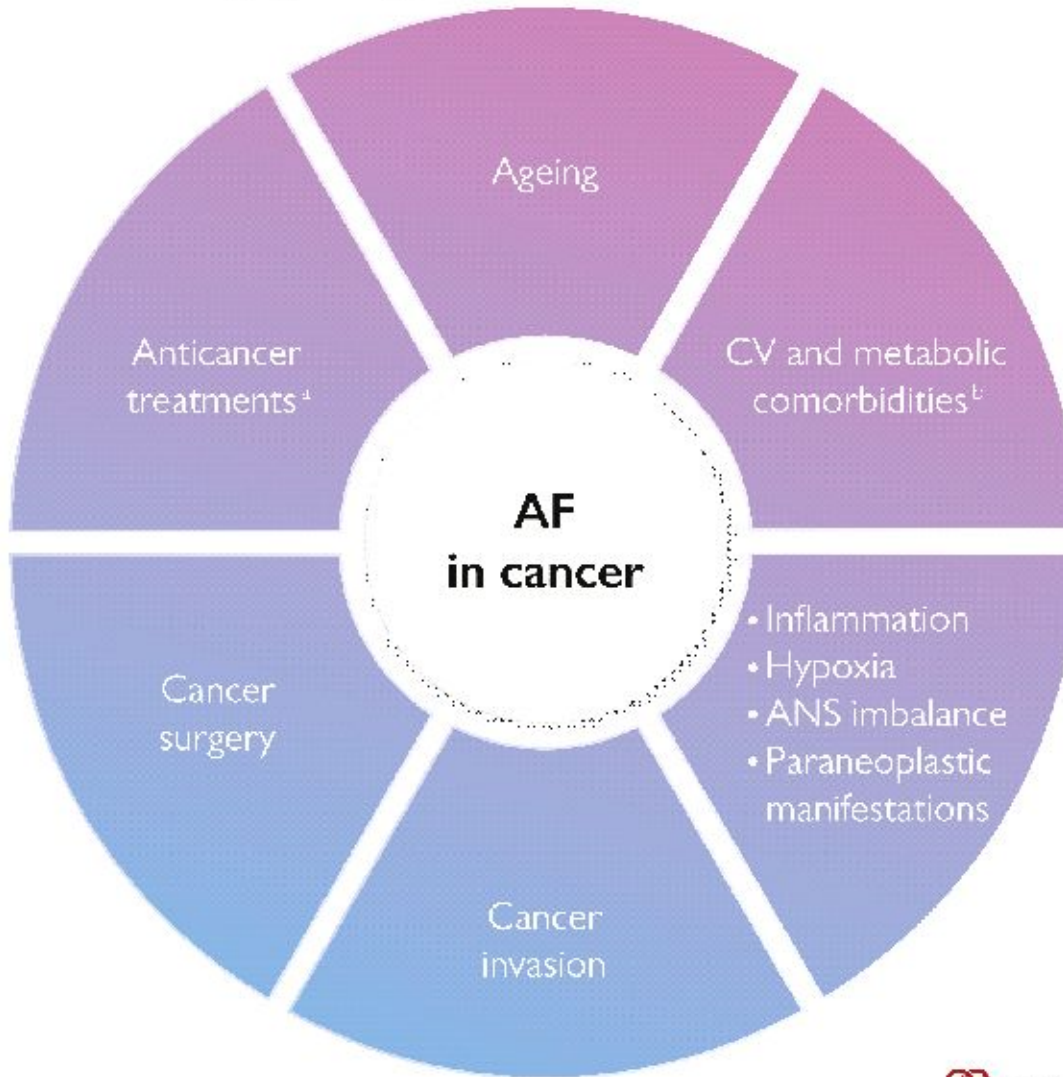


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	Orange	Light Blue

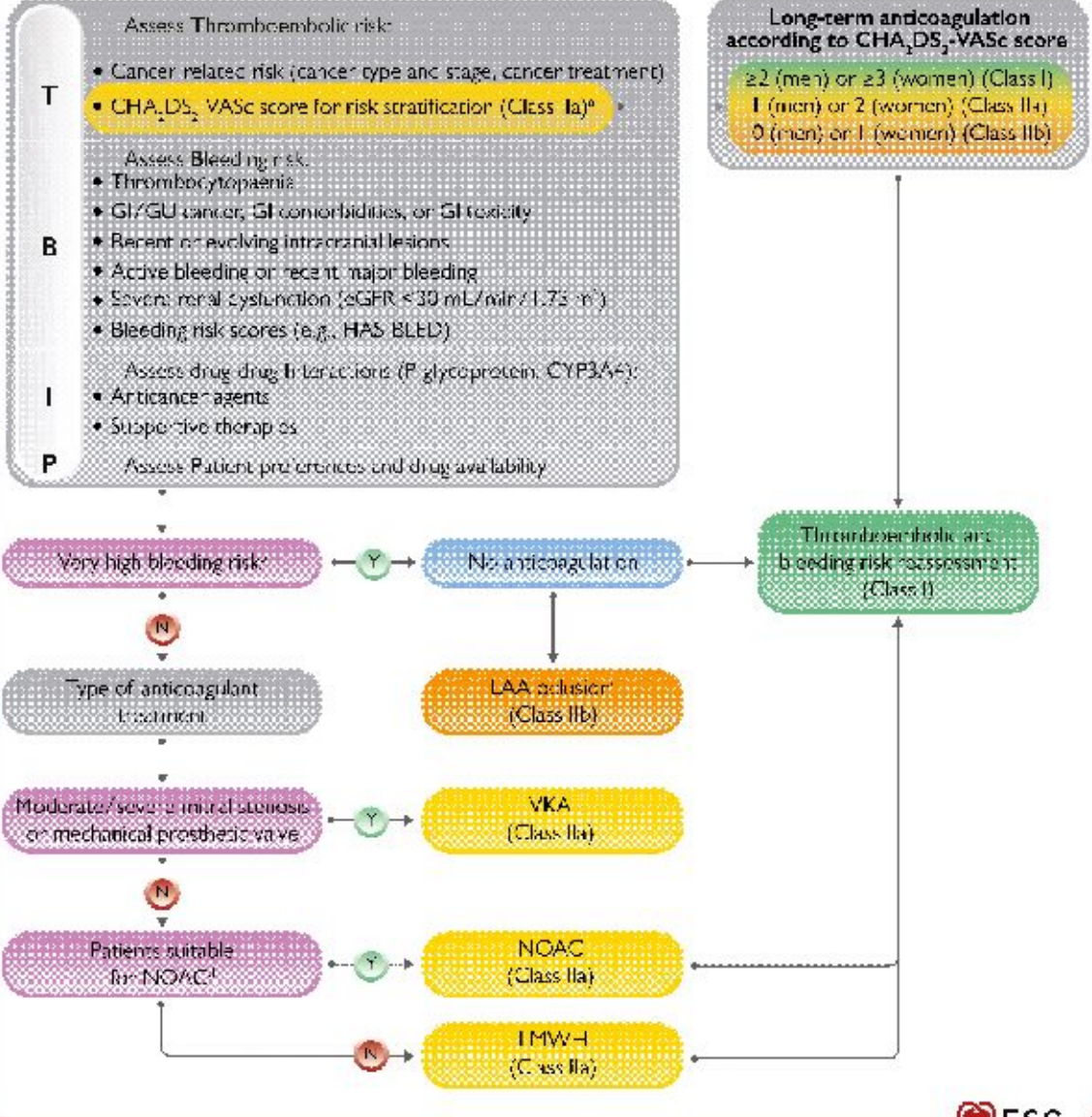




Pathophysiology of AF associated with cancer



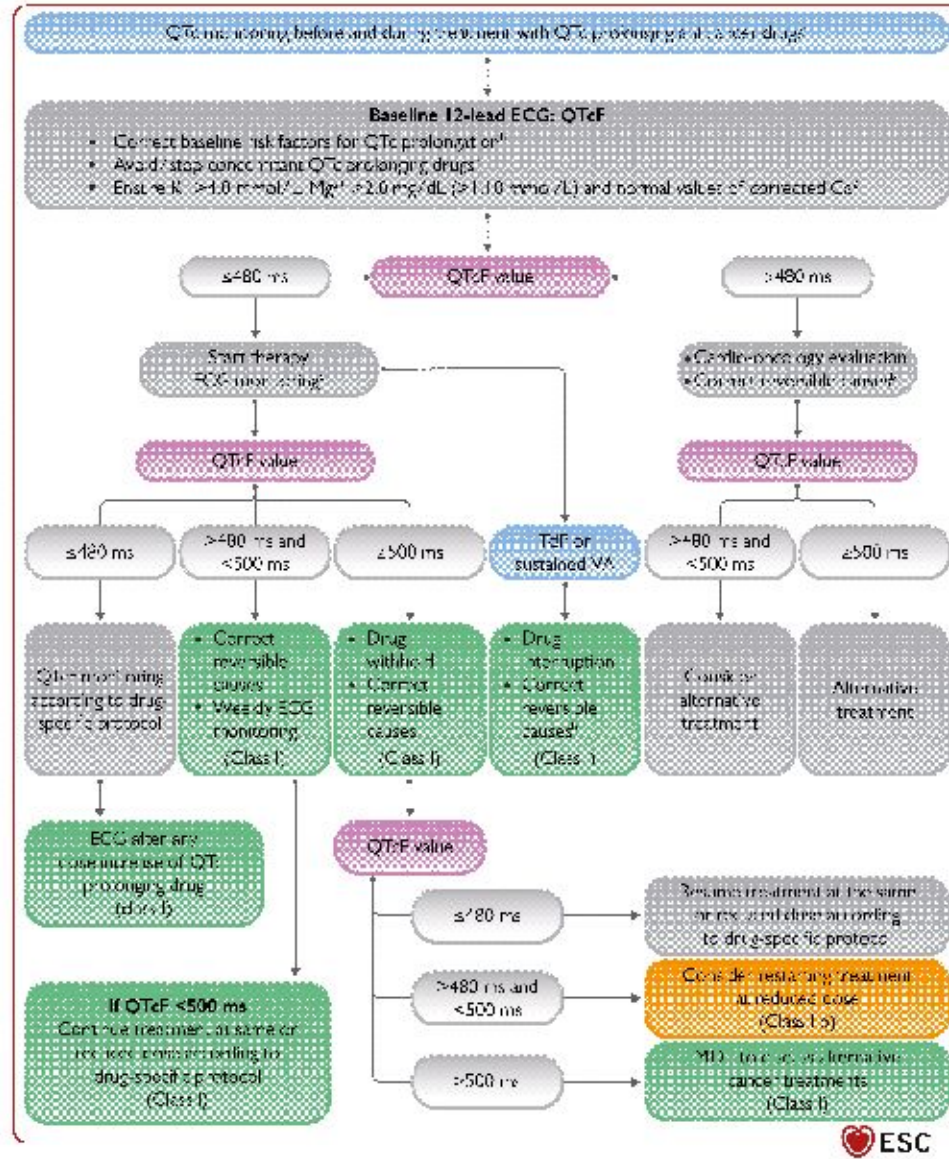
Structured approach to anticoagulation for AF in patients with cancer



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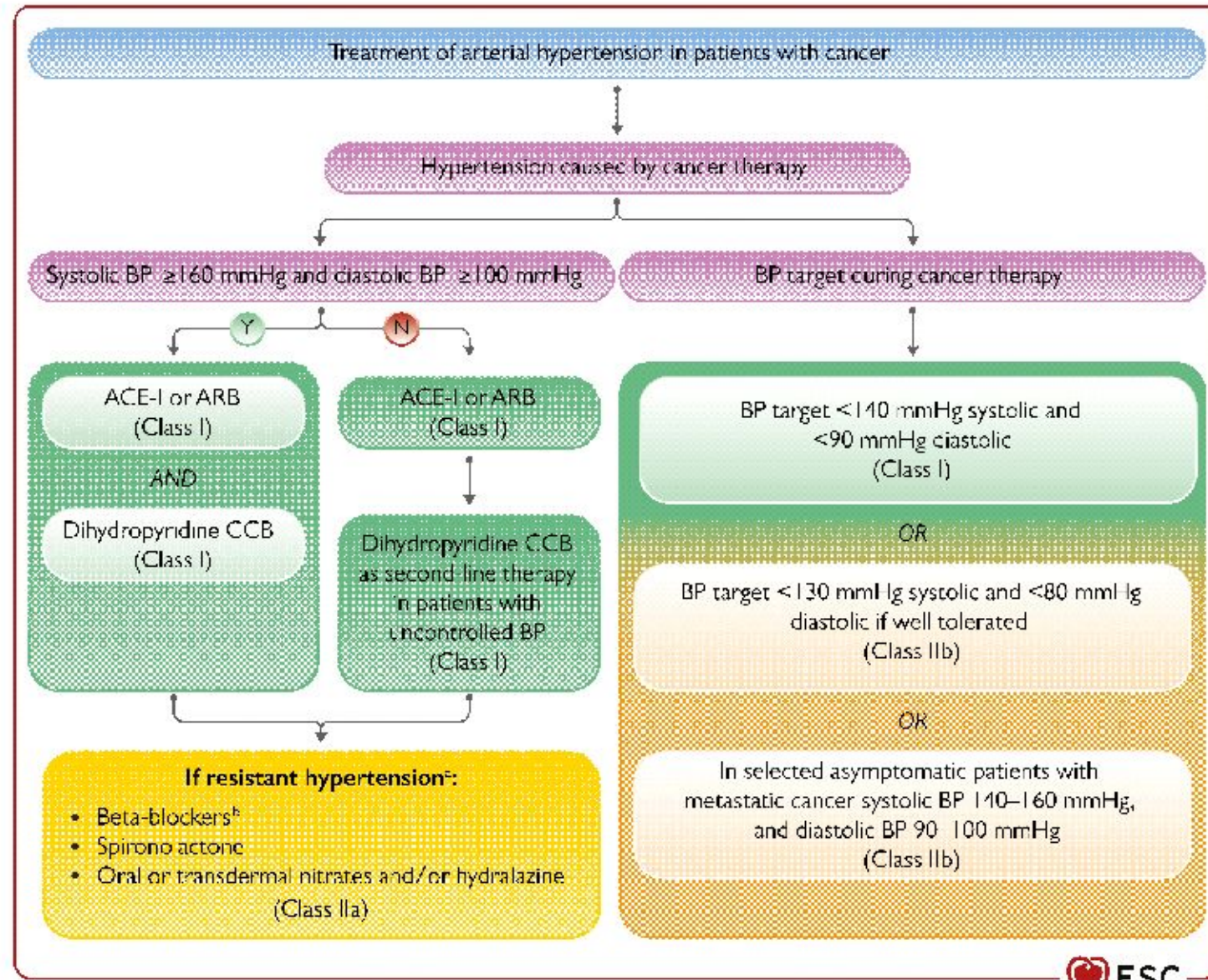




Recommended threshold for asymptomatic hypertension treatment in different clinical scenarios

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

	Green	Blue
	Green	Light Blue
	Green	Light Blue
	Red	Light Blue

Risk factors for VTE in patients with cancer

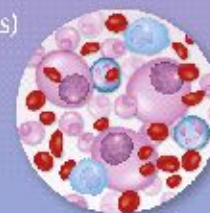
Patient-related factors

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



Cancer-related factors

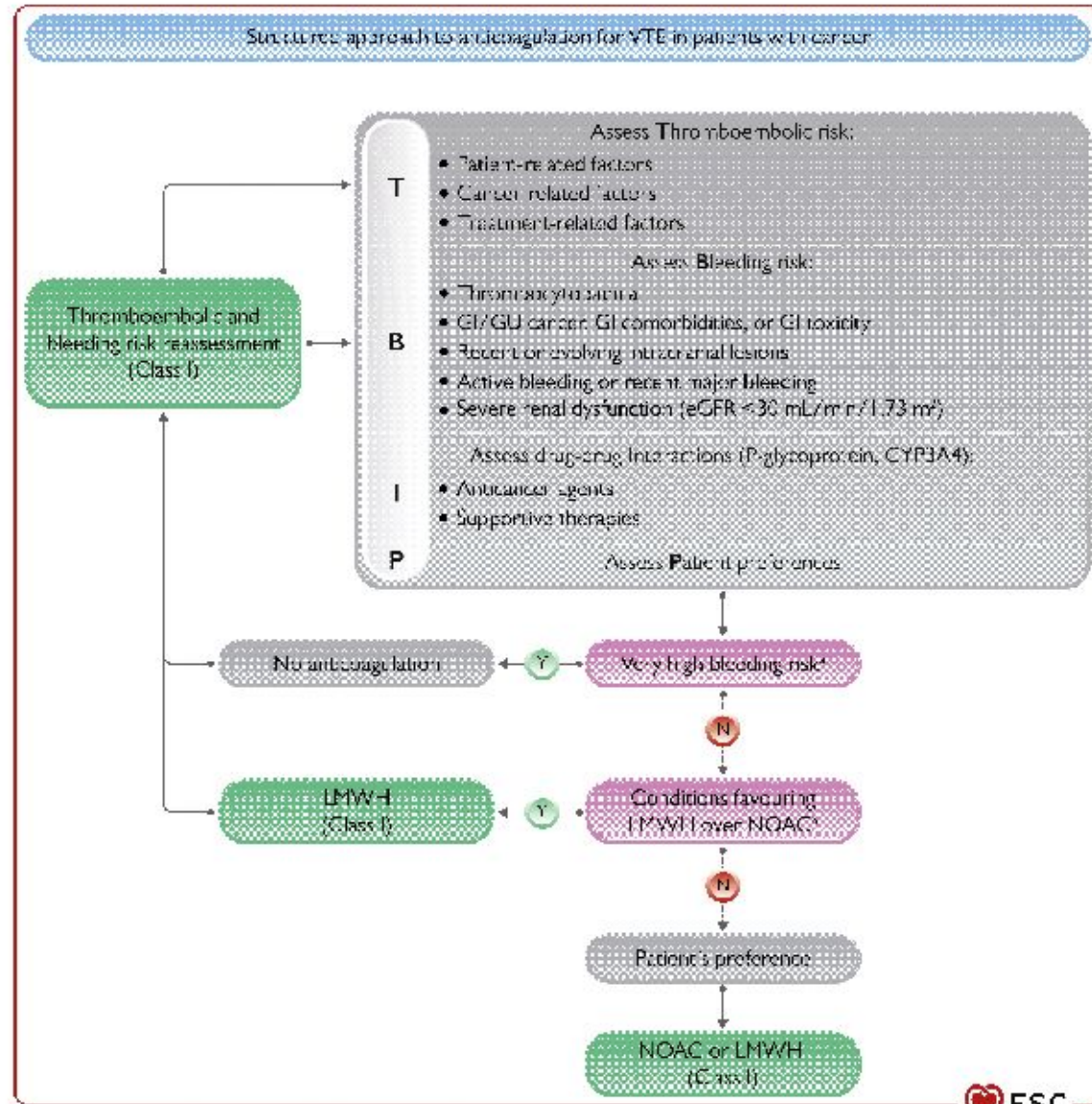
- Cancer type
- Genetic characteristics (JAK2 or K-ras mutations)
- Histology (adenocarcinoma)
- Initial period after diagnosis
- Primary site (pancreas, stomach, ovaries, brain, lung, myeloma)
- Stage (advanced, metastatic)



Treatment-related factors

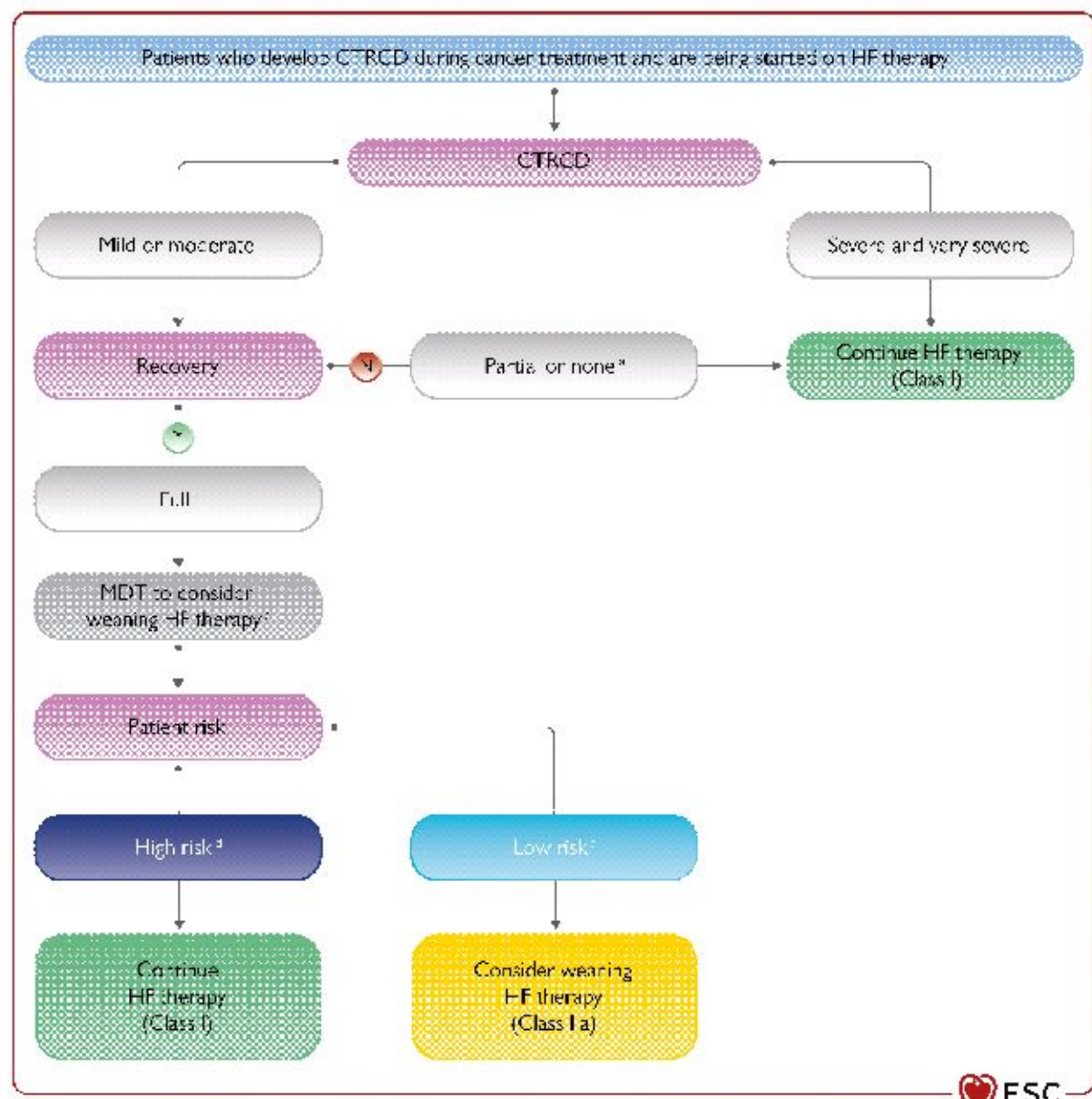
- Cancer therapy^c
- Central venous catheters
- Hospitalization
- Major surgery











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	Green	Light Blue
	Green	Blue
	Green	Blue
	Yellow	Blue

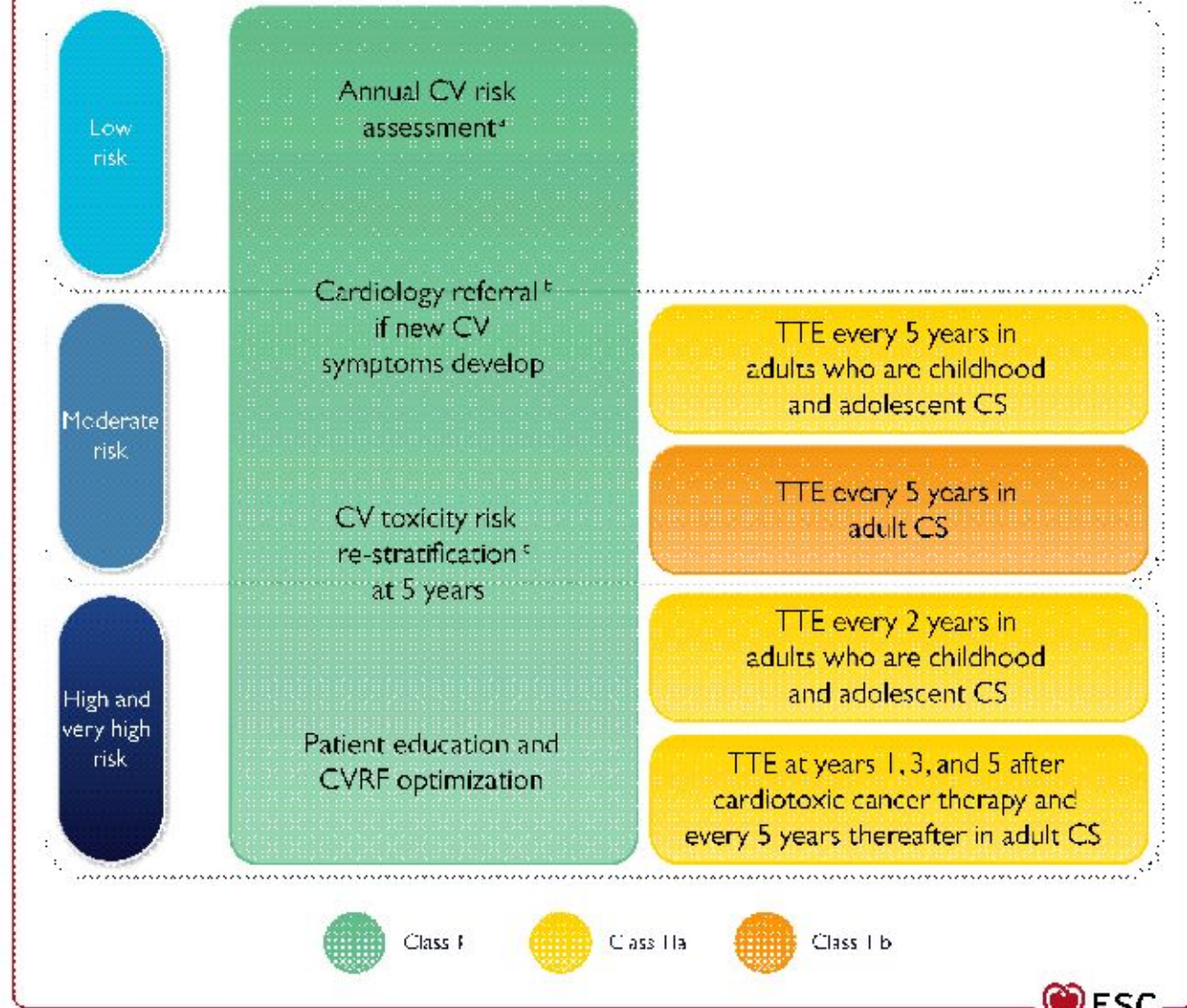
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	Yellow	Blue

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	Green	Light Blue
	Yellow	Blue
	Yellow	Blue

				1

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

Long-term surveillance in asymptomatic CS





Pulmonary artery

- Sarcoma

Right atrium

- Lipoma
- Lymphoma
- Metastasis
- Myxoma
- Sarcoma

Right ventricle

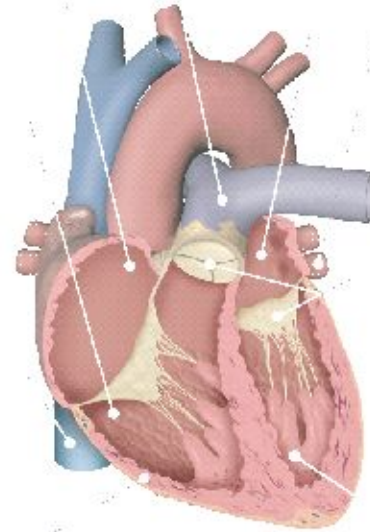
- Fibroma
- Lipoma
- Lymphoma
- Metastasis
- Rhabdomyoma

Inferior cava vein

- Leiomyoma
- Renal tumour

Pericardium

- Lipo sarcoma
- Lipoma
- Lymphoma
- Mesothelioma
- Metastasis


Left atrium

- Lipoma
- Metastasis
- Myxoma
- Sarcoma

Pulmonary veins

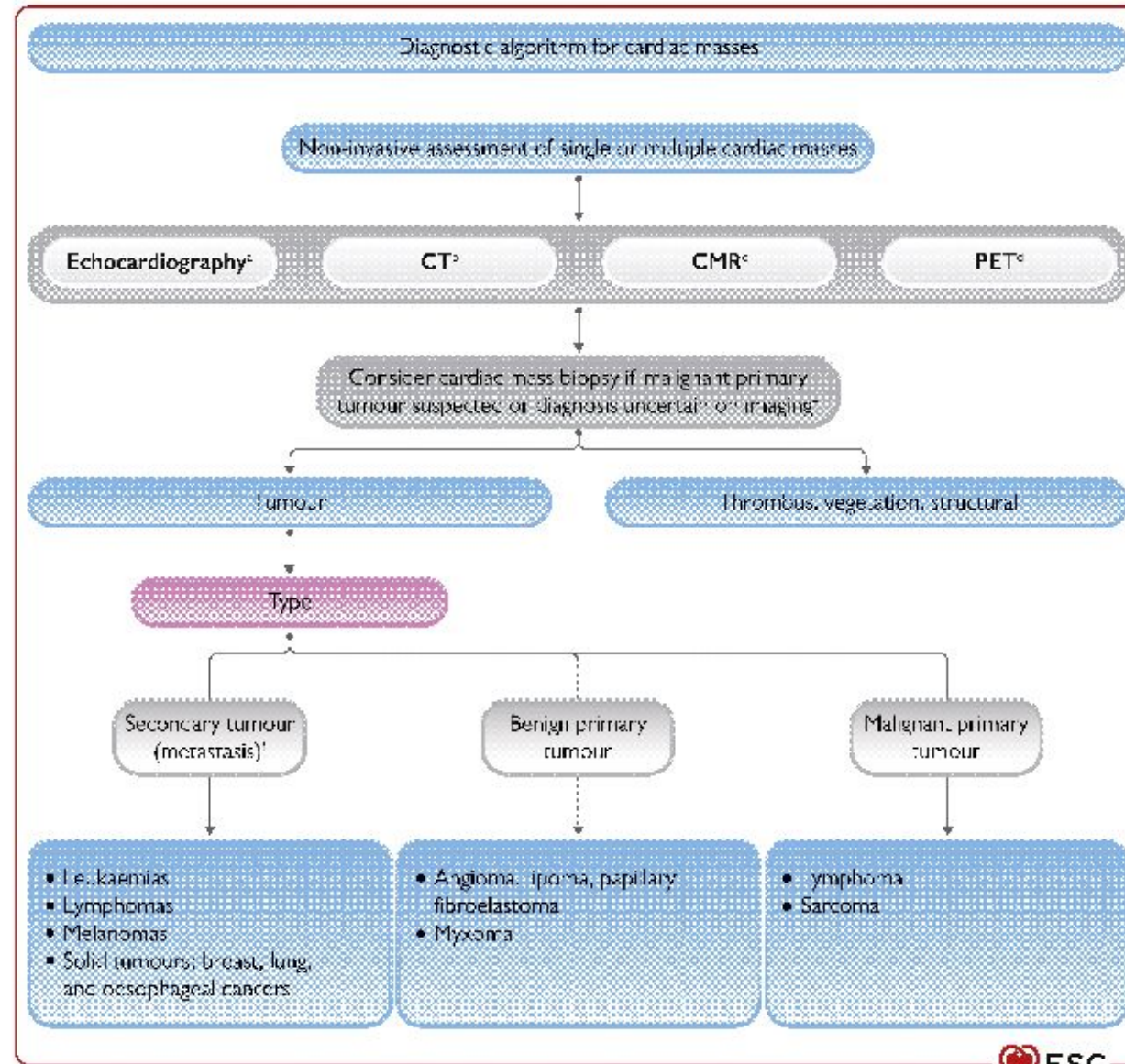
- Lung tumours
- Sarcoma

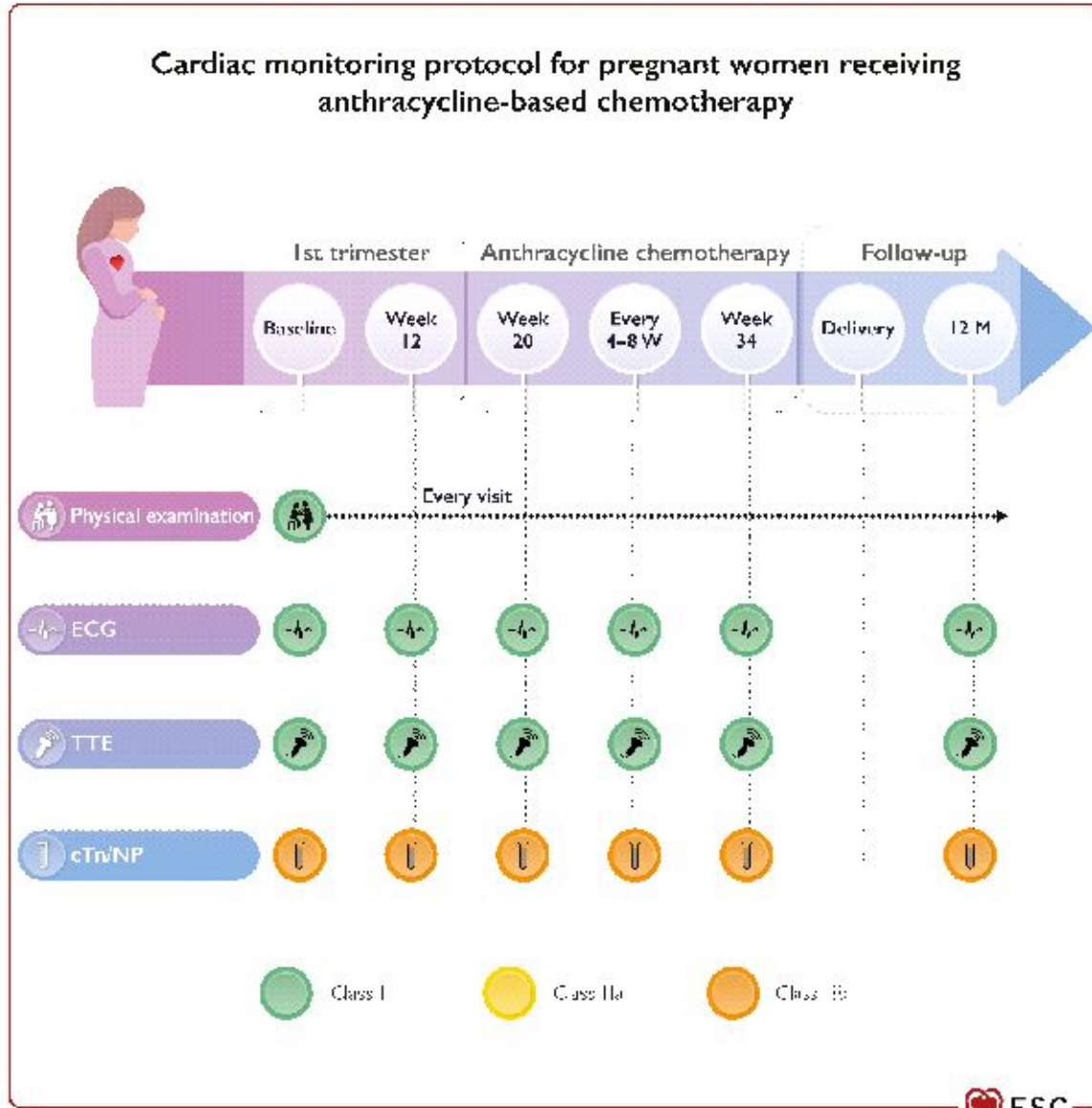
Valves

- Fibroelastoma
- Metastasis

Left ventricle

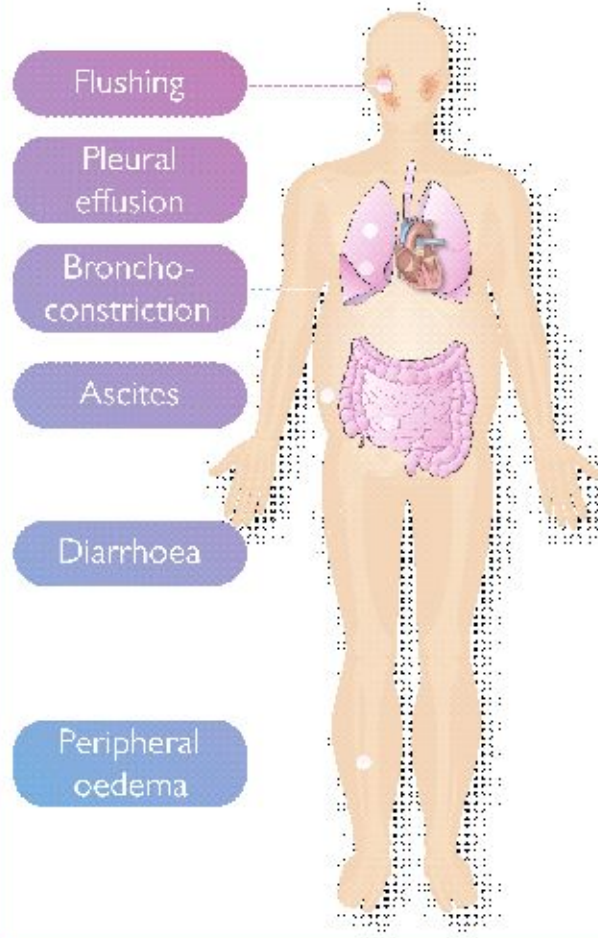
- Fibroma
- Lipoma
- Lymphoma
- Metastasis
- Rhabdomyoma
- Sarcoma



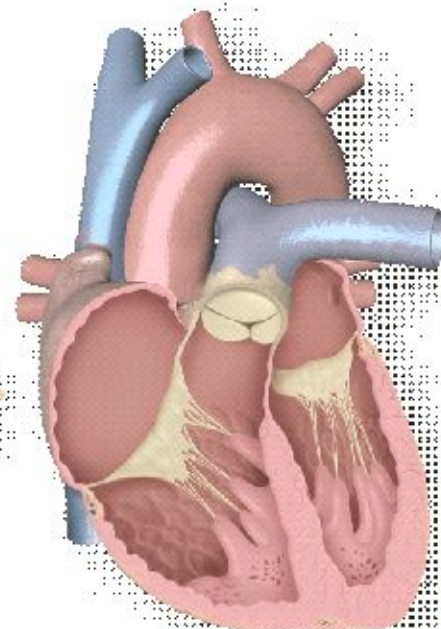


Carcinoid heart disease: clinical features and diagnostic tests

Clinical features



Diagnostic and prognostic tools



CMR

TTE

Circulating serotonin

NP

Urinary 5HIAA

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

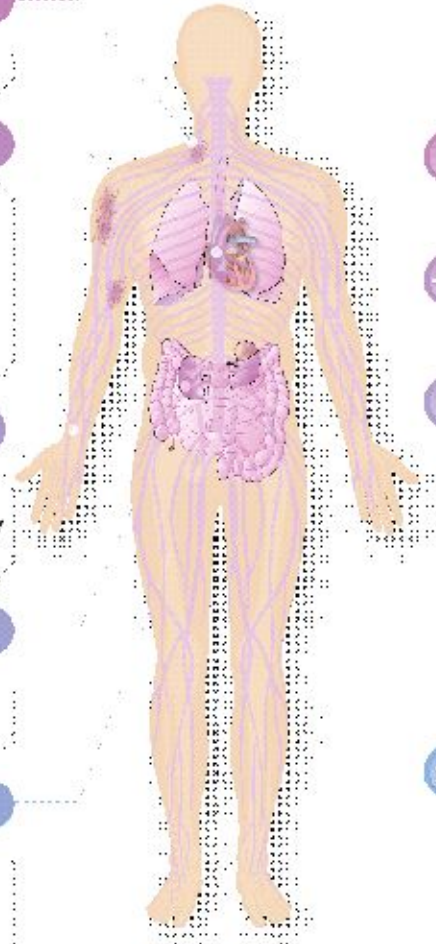
ECG^b

TTE^c

ECHO score ≥ 8 ^d

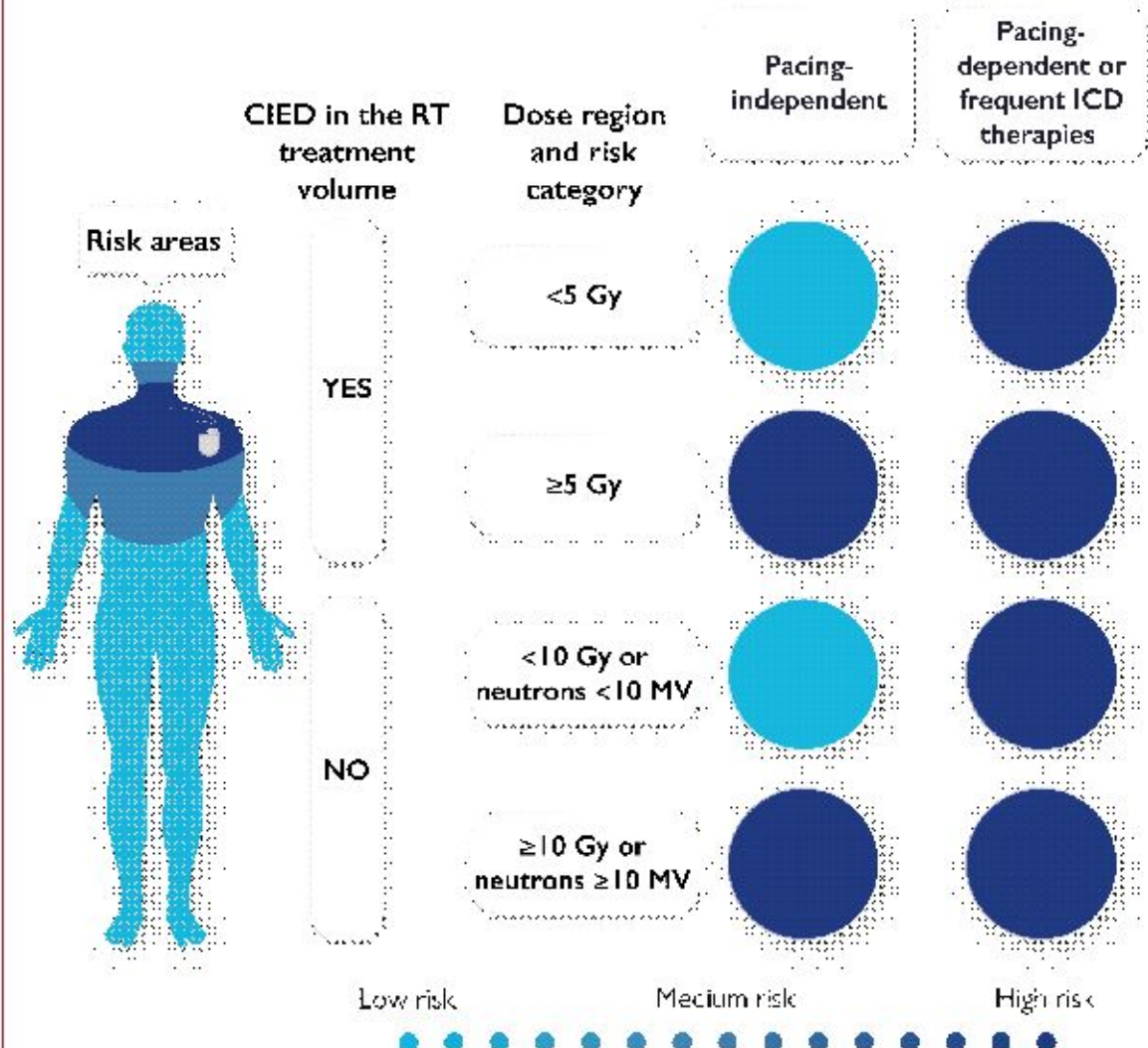
Characteristic echo findings^e

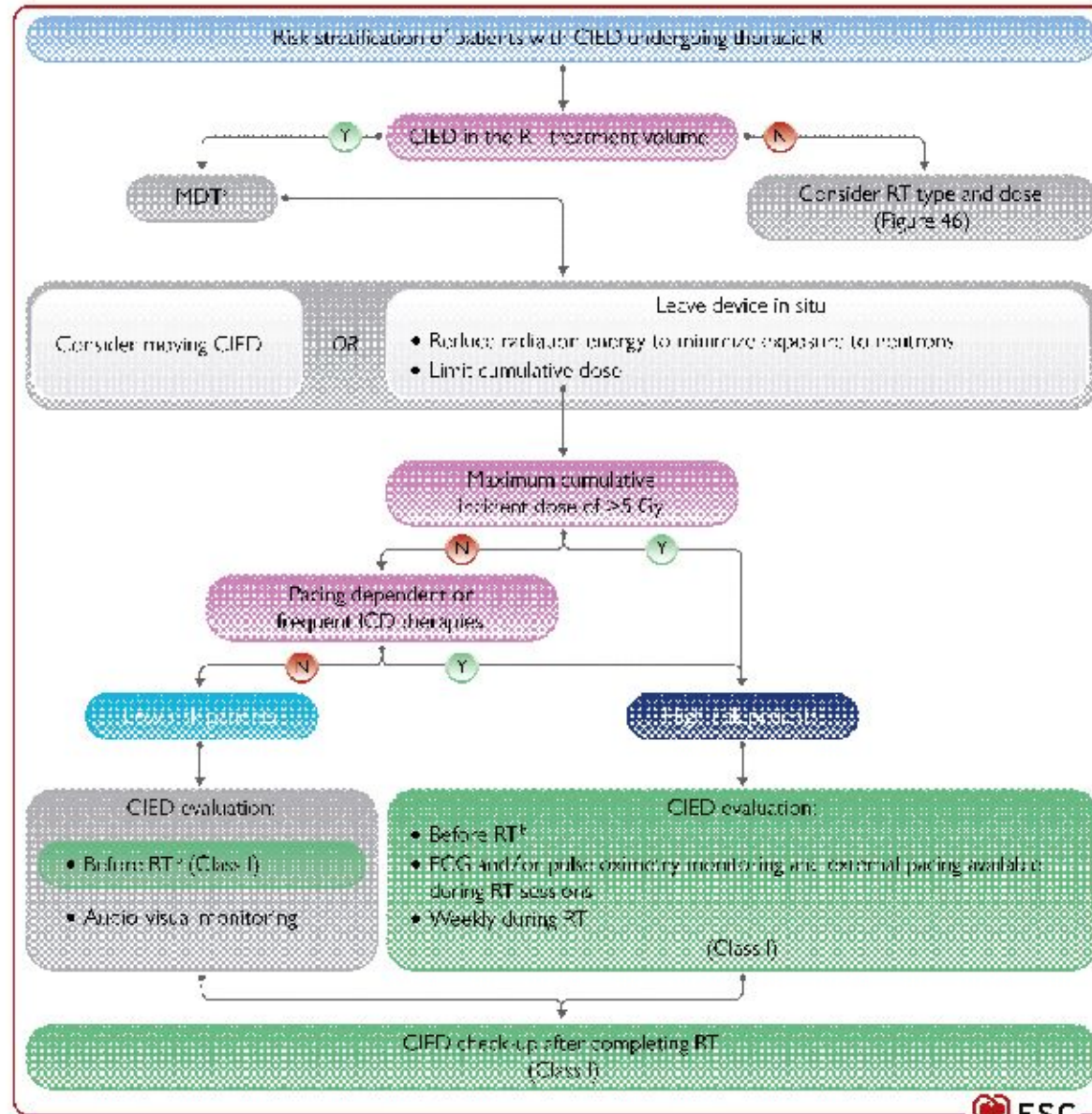
CMR^f

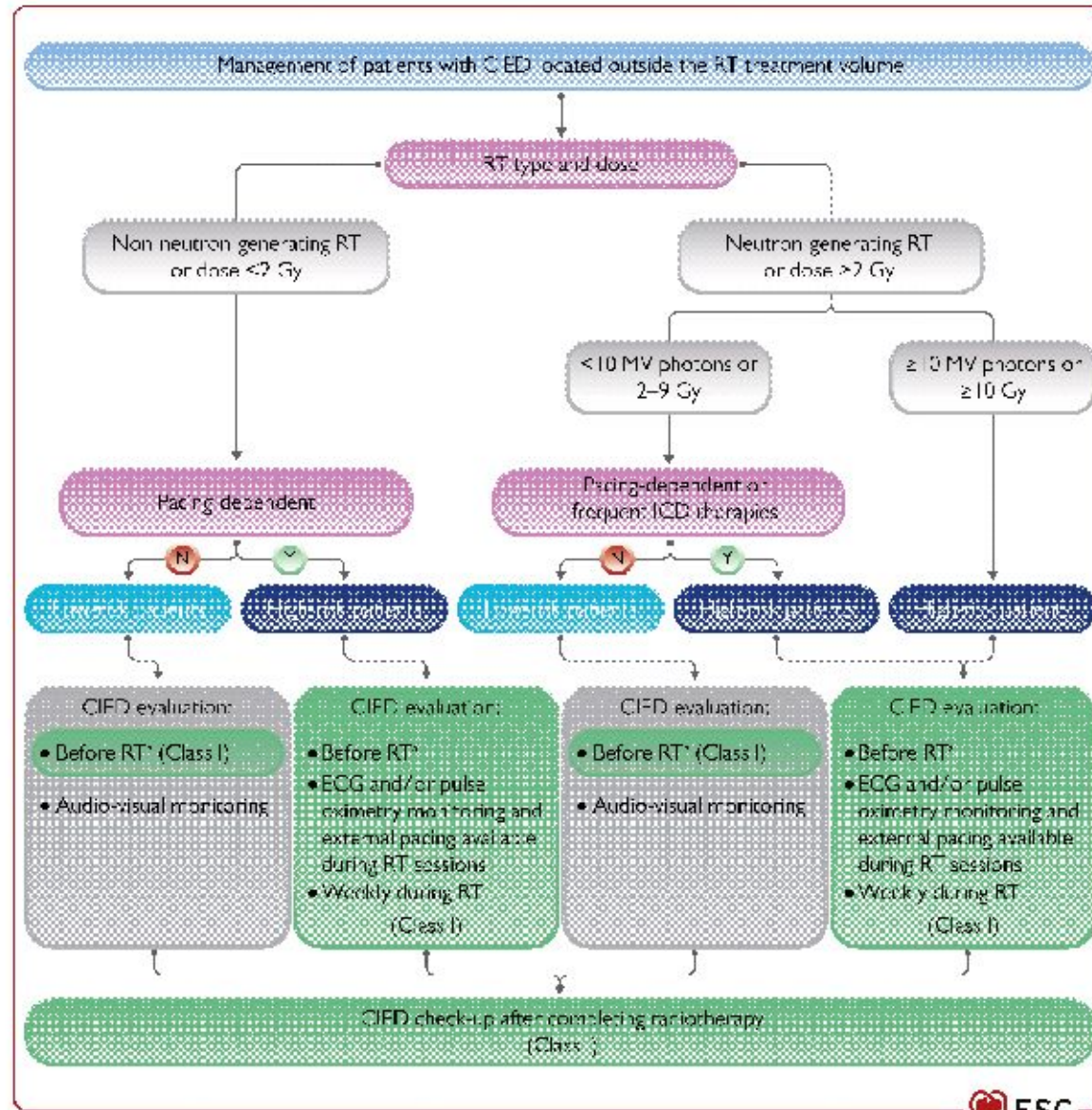


Assessing risk of RT to CIED

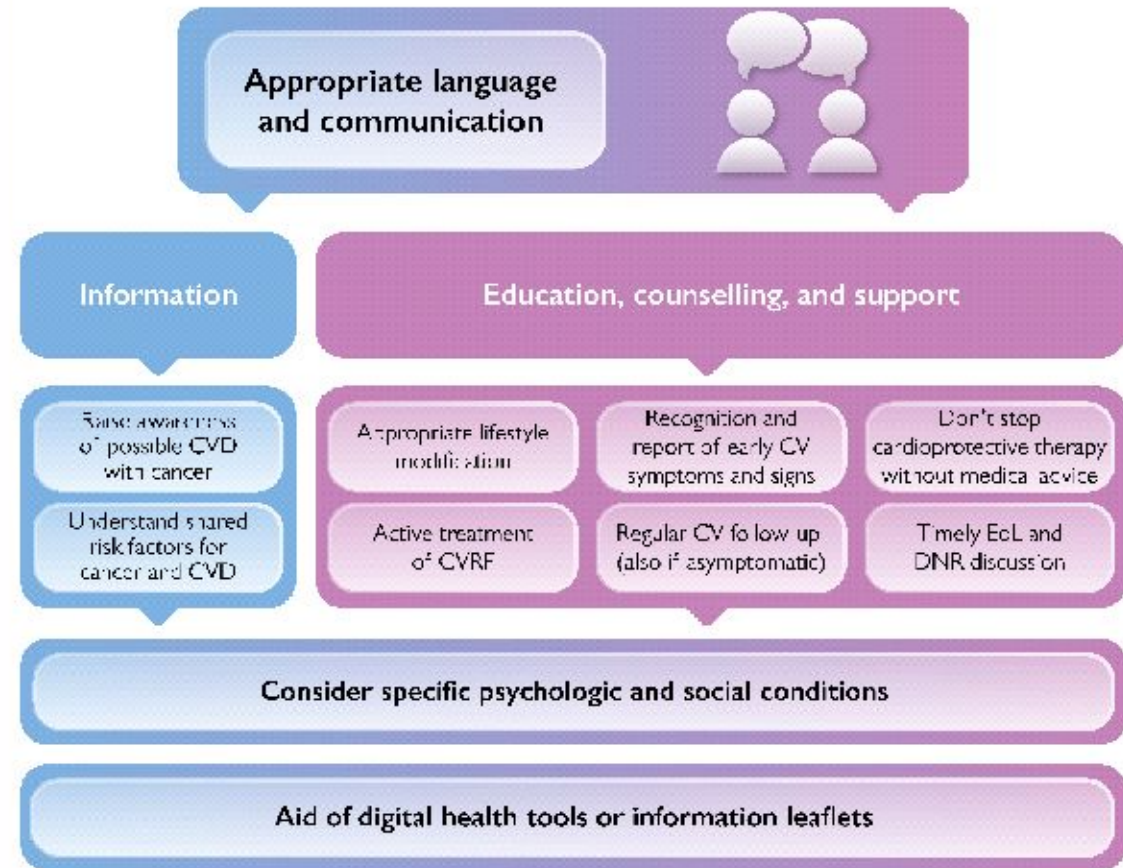
Patient



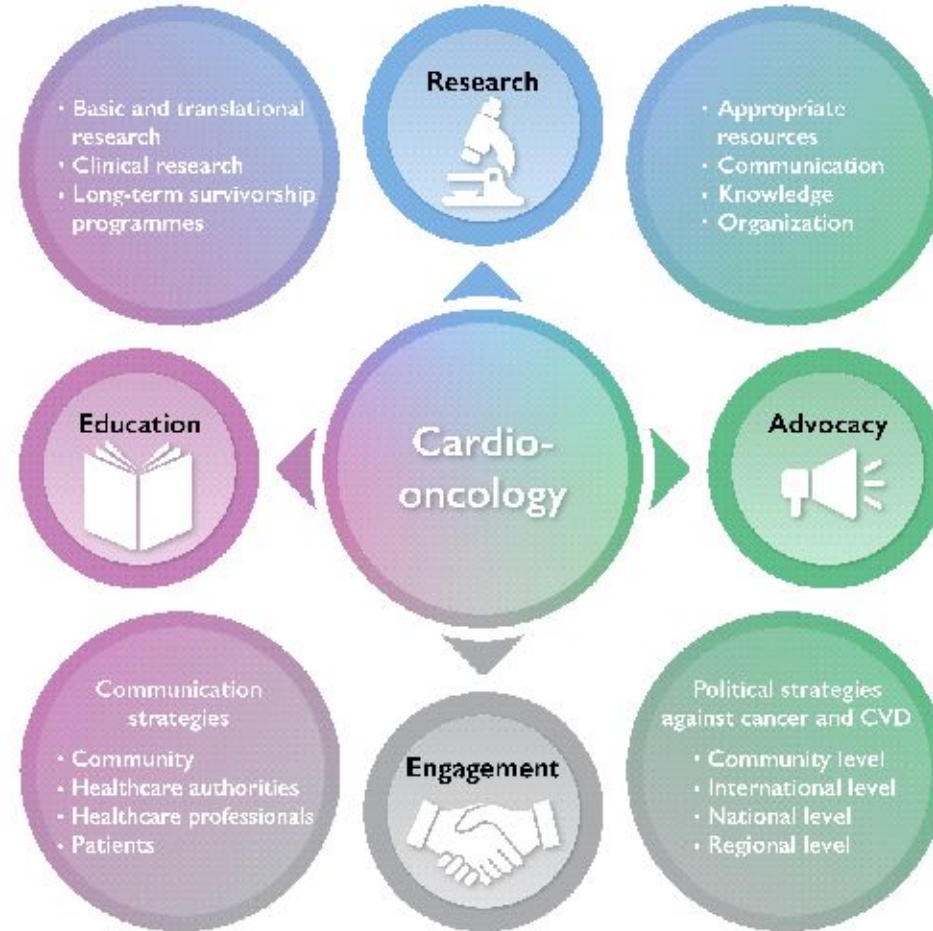


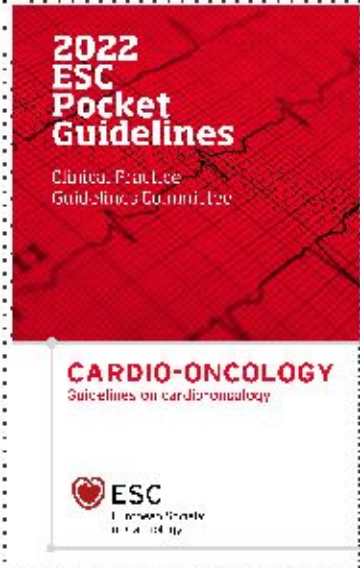


Interaction between healthcare professionals and patients with cancer




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

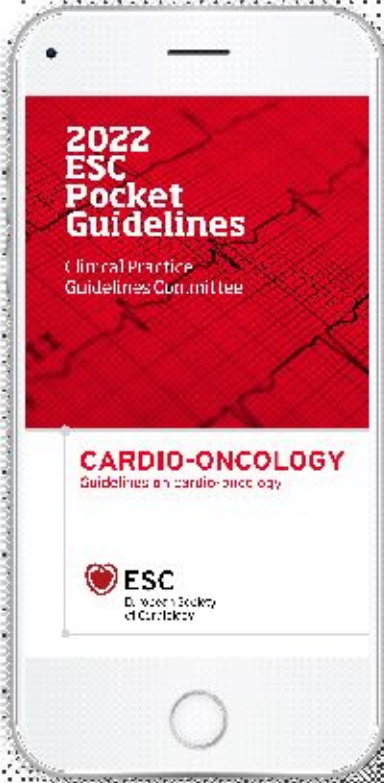




2022 ESC Pocket Guidelines
Clinical Practice Guidelines Committee


CARDIO-ONCOLOGY
Guidelines on cardio-oncology

 ESC
European Society of Cardiology



2022 ESC Pocket Guidelines
Clinical Practice Guidelines Committee

CARDIO-ONCOLOGY
Guidelines on cardio-oncology

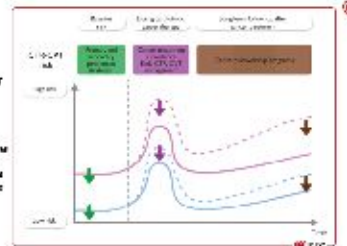
 ESC
European Society of Cardiology

2022 ESC Guidelines on cardio-oncology
Clinical Practice Guidelines

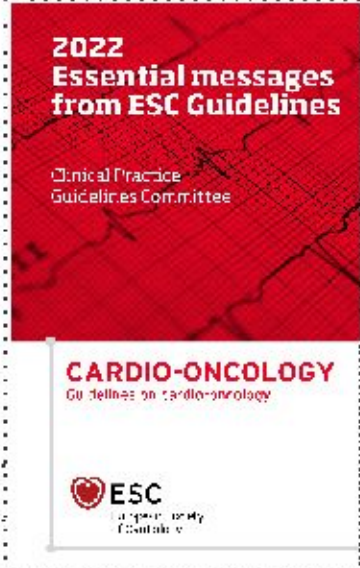
Recommendations for a generic approach to cardiovascular toxicity risk ESC categorization (1)

Recommendation	Class	Level
Oral bisphosphonates or clodronate should be used to prevent skeletal-related events in patients with cancer.	I	A
Oral bisphosphonates should be used to prevent skeletal-related events in patients with cancer.	I	C
The use of bisphosphonates should be considered to reduce the risk of skeletal-related events in patients with cancer.	IIa	B
The use of bisphosphonates should be considered to reduce the risk of skeletal-related events in patients with cancer.	IIb	B

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




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Download the ESC app on the ESC website and the ESC app on the App Store



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Clinical Practice Guidelines Committee

CARDIO-ONCOLOGY
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