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EHRA DOCUMENT

EHRA European Heart Rhythm Association

Same-day discharge after electrophysiological and cardiac implantable electronic device procedures: a clinical consensus statement of the European Heart Rhythm Association (EHRA) and the Association of Cardiovascular Nursing & Allied Professions (ACNAP) of the ESC

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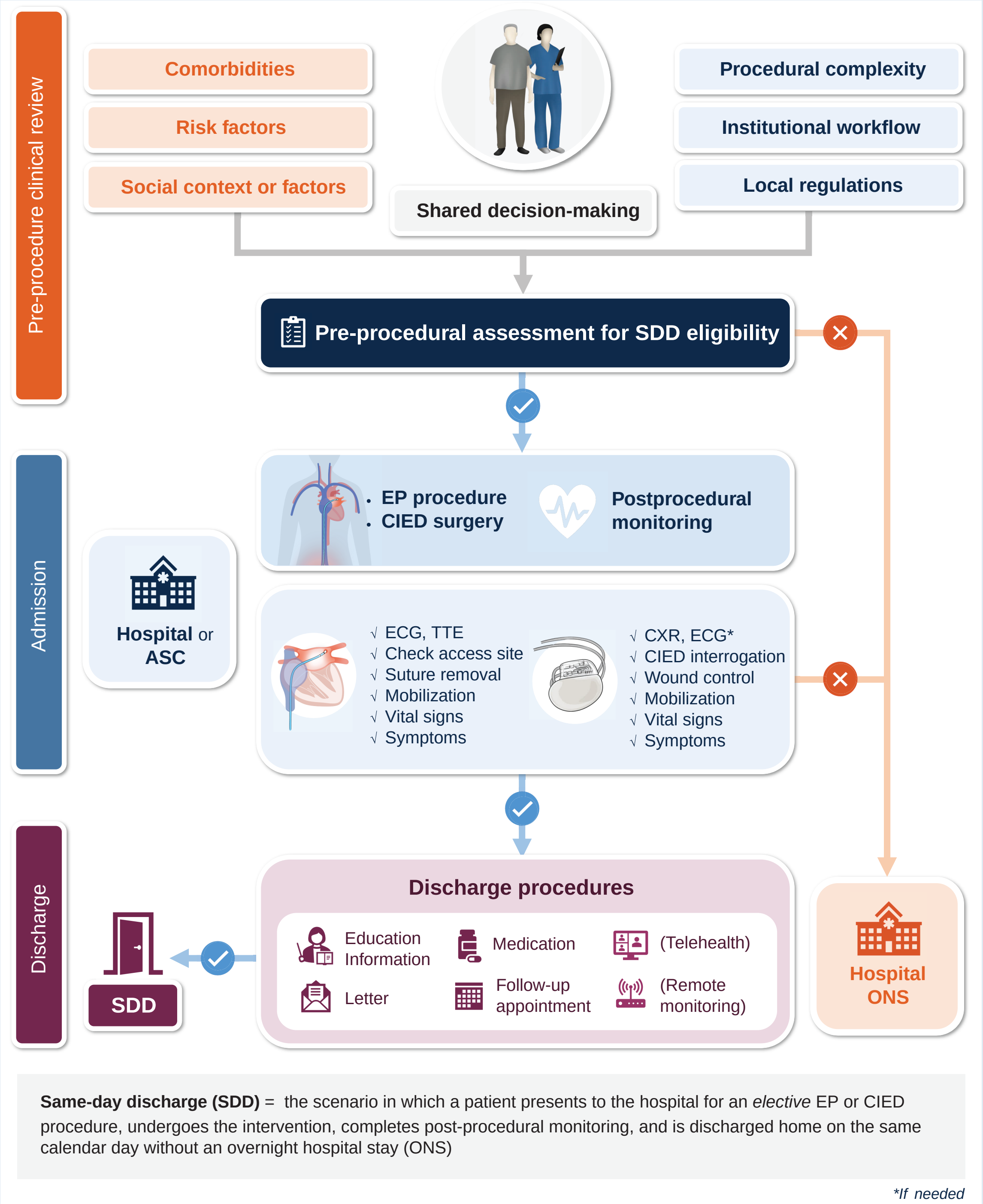
Same-day discharge (SDD) following electrophysiology (EP) and cardiac implantable electronic device (CIED) procedures has emerged as a contemporary care model driven by improvements in procedural safety, efficiency, and healthcare resource constraints. Despite growing evidence supporting its safety in selected patients, adoption of SDD across Europe remains heterogeneous. This clinical consensus statement, developed by the European Heart Rhythm Association (EHRA) of the ESC in collaboration with the Association of Cardiovascular Nursing & Allied Professions (ACNAP) of the ESC, provides an evidence-based and practice-oriented framework for the implementation of SDD pathways after EP and CIED interventions. Based on a structured review of contemporary trials, registries, and expert consensus, the document addresses patient selection, peri-procedural management, early complication surveillance, discharge criteria, and post-discharge follow-up. Procedure-specific considerations are provided for catheter ablation and device implantation. This consensus aims to harmonize clinical practice, reduce variability in care, and support the safe and sustainable expansion of SDD across diverse European healthcare systems.

Graphical Abstract



Keywords Ablation • Atrial fibrillation • Cardiac implantable electronic device • Overnight stay • Same-day discharge

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Abbreviations

ACNAP	Association of Cardiovascular Nursing & Allied Professions
AF	Atrial fibrillation
ASC	Ambulatory surgical centre
AV	Atrioventricular
CIED	Cardiac implantable electronic device
CRT	Cardiac resynchronization therapy
CSP	Conduction system pacing
DOAC	Direct oral anticoagulant
DRG	Diagnosis Related Group
ECG	Electrocardiogram
EHRA	European Heart Rhythm Association
EP	Electrophysiology/electrophysiologic
ESC	European Society of Cardiology
FU	Follow-up
HRS	Heart Rhythm Society
ICD	Implantable cardiac defibrillator
LLP	Leadless pacemaker
ONS	Overnight stay
PFA	Pulsed field ablation
PREM	Patient-reported experience
PROM	Patient-reported outcome
RCT	Randomized controlled trial
SDD	Same day discharge
SVT	Supraventricular tachycardia
TLE	Transvenous lead extraction
US	Ultrasound
VCD	Vascular closure device
VT	Ventricular tachycardia

Introduction

Over the past decades, technological and procedural advances have reshaped electrophysiology (EP) and cardiac implantable electronic device (CIED) practice. Improvements in mapping systems, ablation energy sources, vascular access techniques, imaging guidance, and device technology have translated into higher procedural safety, shorter procedural durations and higher efficacy, and a steady decline in major complication rates.[1] In parallel, however, healthcare systems are facing escalating pressures from increasing procedural volumes, persistent workforce constraints, and rising economic demands. Within this context, care models that preserve clinical quality while improving efficiency have become a strategic priority.[2,3] Same-day discharge (SDD), despite being undermined in some health care systems by lack of reimbursement, has therefore gained growing attention as a potential solution to support sustainable EP and CIED service delivery without compromising patient safety.[4–7]

Although SDD is well established in several low-risk cardiovascular interventions and diagnostic procedures, its broader implementation after catheter ablation and CIED implantation has, until recently, remained limited, particularly across Europe.[8,9] This cautious uptake has historically been driven not only by concerns regarding delayed access-site bleeding, pericardial effusion, arrhythmia recurrence, device-related complications, and anaesthesia-associated adverse events, but also by reimbursement systems that penalise institutions financially, if the patient is sent home the same day. However, contemporary evidence, from large registries, meta-analyses, and randomized trials, now consistently demonstrates that, in carefully selected patients treated within structured institutional pathways, SDD is comparable to overnight observation with respect to complication rates, hospital readmissions, and early mortality.[4,10–17]

Differences in national reimbursement structures, institutional infrastructure, medical and legal frameworks, staffing models, and local culture toward ambulatory cardiovascular care all contribute to this variability.[18–20] Moreover, clear and harmonized procedural guidance addressing patient selection, peri-procedural management, post-procedural monitoring, discharge criteria, and early follow-up remains limited. Consequently, considerable variation persists between centres and countries despite comparable expertise.

This clinical consensus statement of the European Heart Rhythm Association (EHRA) of the ESC, was developed in collaboration with the Association of Cardiovascular Nursing & Allied Professions (ACNAP) of the ESC, seeks to address this gap. Beyond summarizing the available scientific evidence, the primary intent of this document is deliberately practical. By mapping the complete patient pathway, from pre-procedural risk assessment and intra-procedural optimization to post-discharge surveillance, remote monitoring, and institutional implementation, it aims to provide clinicians, especially those who are beginners in SDD practice, with directly applicable advice to support the safe, reproducible, and wider adoption of SDD for EP and CIED procedures across diverse European healthcare environments (*Figure 1*), while reinforcing that the final decision between SDD and ONS rests with the treating physician or multidisciplinary team of physicians, reflecting their clinical judgment.

Methodology

The objective of this clinical consensus statement is to provide an evidence-based and expert consensus-based framework for SDD pathways for EP and CIED procedures. SDD is defined as a scenario in which a patient is admitted for an elective EP or CIED procedure, undergoes the intervention, completes post-procedural monitoring, and is discharged home on the same calendar day without any overnight hospital stay (*Table 1*). An overnight stay (ONS) is defined as a scenario when the patient presents on a particular calendar day, undergoes an EP or CIED procedure, but stays past midnight, and is discharged home the next calendar day or thereafter. A scenario when the patient presents on a particular calendar day, stays at the hospital overnight, undergoes an EP or CIED procedure on the following day, even if the patient is then discharged on the day of the procedure, is considered as an alternative definition of ONS (*Table 1*).

In this consensus document, different categories of advice and their respective definitions are presented in *Table 2*. The evidence supporting each advice has been classified in different categories based on the type, quality, and quantity of respective sources (*Table 3*). The writing process included face-to-face and web-based meetings among the authors to discuss and agree on each advice and on all statements listed in the tables or bullet-point summaries of areas of uncertainty. In addition, formal voting was performed for all expert opinion advice to determine the level of agreement among the members of the writing group according to the predefined consensus definitions shown in *Table 3*. Every proposed advice was included only if the voting results were at least 70% in support.

Patient selection and pre-assessment for same-day discharge

The implementation of structured SDD protocols for EP procedures, both catheter ablations, and CIED procedures requires meticulous patient selection, and pre-defined social circumstances to ensure both safety and reliable follow-up.[4,21] Establishing harmonized SDD pathways across centres enhances resource efficiency, patient satisfaction, and hospital throughput while maintaining very low 30-day readmission rates (emergency room visits of 4% after SDD).[4,22–25] This consensus document aims to propose criteria for both ablation and device procedures to ensure consistency and safety across institutions.[21] The proposed criteria (*Table 4*) are based on current data and clinical judgement (see Supplementary material online, *Table S1*). Thus, the final decision on SDD vs. ONS during preassessment is at the discretion of the treating physicians or a multidisciplinary team based on their clinical assessment of the patient.

While simpler ablations for supraventricular tachycardia (SVT) or typical atrial flutter have long been established as suitable for SDD, atrial fibrillation (AF) ablation requires strict selection due to a higher risk of delayed complications.[17,22,26] VT ablation has limited application as SDD since most cases require urgent or emergency intervention rather than scheduled procedures. Similarly, CIED procedures such as pacemaker implantation or generator replacement are appropriate for SDD when procedural safety and post-discharge support are ensured.[27,28] Procedures such as cardiac resynchronization therapy (CRT), implantable cardioverter-defibrillator (ICD) systems or transvenous lead extractions (TLE) should follow strict selection criteria depending on comorbidities and procedural duration and may warrant prolonged observation but are not contraindicated for SDD.[29–31]

Patient-related factors

There is a lack of patient-specific subgroup analyses in SDD studies, limiting specific advice substantially.[3] In addition to informed consent and patient motivation, eligibility for SDD includes stability of clinical conditions including heart failure (stable NYHA I–II), mental health, pulmonary disease, and anticoagulation. A history or presence of acute cardiac decompensation favours overnight observation.[25] An eGFR <30 mL/min/1.73 m^2 or recent acute kidney injury increases procedural risk.[32] Untreated severe sleep apnoea may contraindicate SDD for procedures requiring deep sedation.[33] Additional factors to consider may include body mass index > 35 kg/m^2, lack of proximity to the hospital, frailty, and lack of reliable social support at home.[17] Studies show that up to 85% of screened patients meet these eligibility criteria, and 85–90% are successfully discharged on the same day.[4,15,17,25,34]

SDD is increasingly adopted, even among higher-risk groups such as elderly patients and those receiving anticoagulation.[35–37] With most EP interventions now standardized and demonstrating favourable safety profiles, there is an increasing number of centres, in which SDD has become routine in this patient group, especially for SVT and AF ablation procedures.[25,38]

While SDD offers advantages such as shorter hospital stay and lower infection risk, it must be balanced against the need for monitoring in patients with severe comorbidities and those for whom adequate postoperative care, particularly after sedation or general anaesthesia, cannot be ensured by a designated caregiver. Emerging data indicate that catheter ablation for AF can generally be performed safely in the elderly.[39,40] Although outcomes in AF ablation in general are comparable to younger populations, very advanced age (>80 years) and concomitant heart failure remain predictors of stroke, periprocedural complications, and mortality.[41] Finally, SDD (i.e. after CIED box changes) may be beneficial for patients with cognitive impairment such as dementia by minimizing hospital-related confusion, reducing the risk of delirium, and allowing recovery in a familiar home environment.

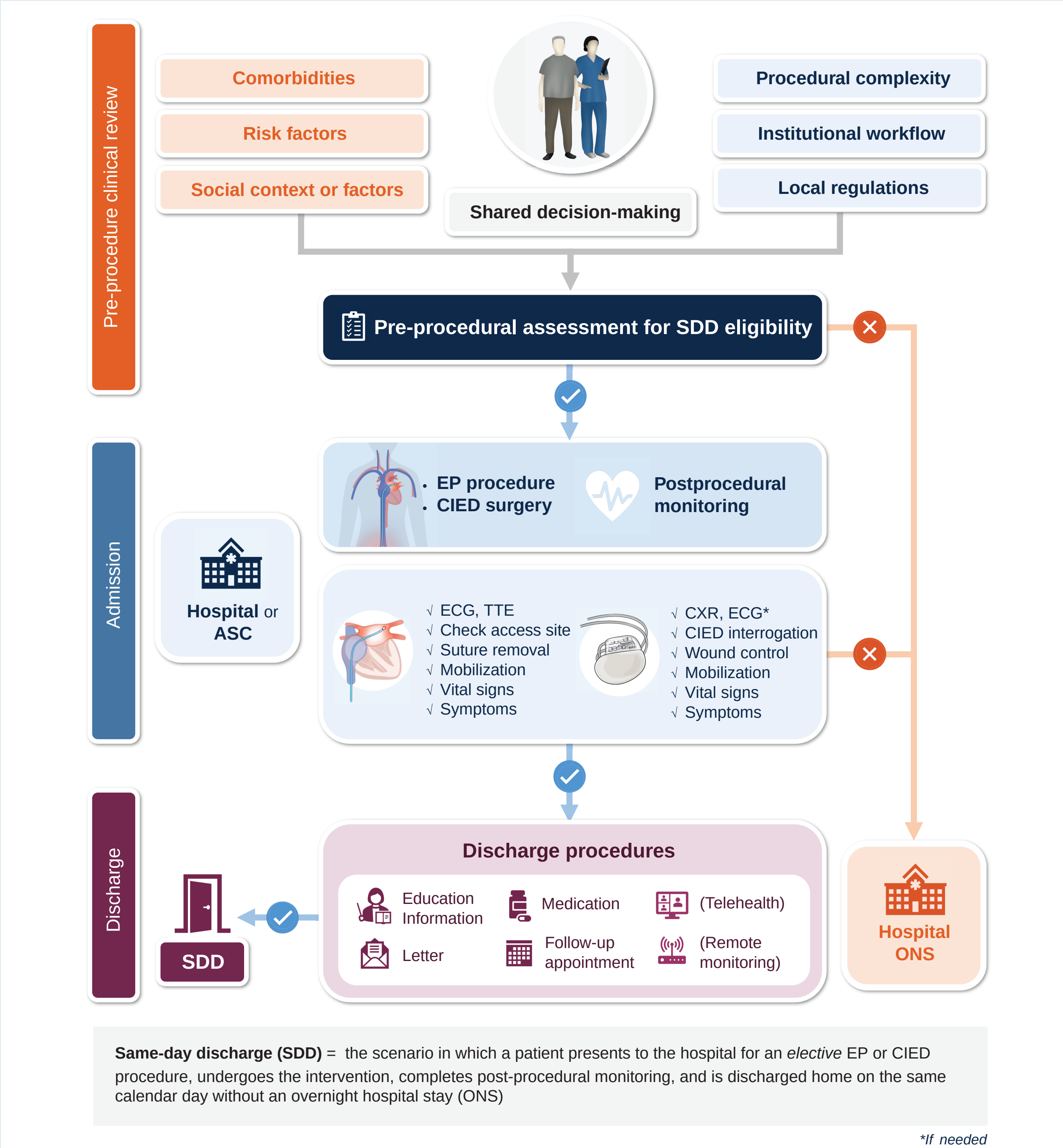

Figure 1 Central illustration. Proposed clinical pathway for same-day discharge (SDD) following elective cardiac implantable electronic device and electrophysiology procedures, from pre-procedure clinical review to admission and discharge. ASC, ambulatory surgical centre; CIED, cardiac implantable electronic device; CXR, chest X-ray; ECG, electrocardiogram; EP, electrophysiology; ONS, overnight stay; SDD, same-day discharge; TTE, transthoracic echocardiography.

Social factors

Following procedures performed under general anaesthesia or deep sedation, a responsible adult should escort the patient home and provide support for the first 24 h after surgery.[42] A carer at home may not be essential if there has been a good recovery after brief procedures and where any postoperative haemorrhage is likely to be obvious and controllable with simple compression.[4,43,44] Within this time period, travel time ≤60–90 min to a hospital with reliable contact and emergency access is preferred.[45]

Pathway considerations

Structured pre-assessment is essential to ensure the safety of SDD procedures (*Figure 2*). According to 2021 ESC guidelines

Table 1 Definitions

Concept	Definition
Same-day discharge (SDD)	The scenario in which a patient presents to the hospital for an elective EP or CIED procedure, undergoes the intervention, completes post-procedural monitoring and care, and is discharged home on the same calendar day without an overnight hospital stay
Overnight stay (ONS)	The scenario when a patient presents on a particular calendar day, undergoes an EP or CIED procedure, but stays past midnight, and is discharged home the next calendar day or thereafter. OR A scenario when the patient presents on a particular calendar day, stays at the hospital overnight, undergoes an EP or CIED procedure on the following day, even if the patient is then discharged on the day of the procedure

CIED, cardiac implantable electronic device; EP, electrophysiology.

Table 2 Definitions of categories of advice and their respective definition

Definition	Category of advice	Icons
Evidence or general agreement that a given measure is clinically useful and appropriate	Advice to do	
Evidence or general agreement that a given measure may be clinically useful and appropriate	May be appropriate to do	
No strong advice can be given, lack of data, inconsistency of data	Areas of uncertainty	
Evidence or general agreement that a given measure is not appropriate or harmful	Advice not to do	

on cardiac pacing and CRT, the EHRA expert consensus statement and practical guide on optimal implantation technique for conventional pacemakers and implantable cardioverter defibrillators, and the EHRA/Heart Rhythm Society/Asia Pacific Heart Rhythm Society/Latin American Heart Rhythm expert consensus statement on catheter and surgical ablation of AF documents, patient evaluation should systematically address clinical status, procedural risk, and social support before SDD is considered.[3,46,47] Pre-procedural ambulatory assessment includes pre-anaesthetic check, vital signs, admission file, laboratory tests (taken/planned), patient education (optional as nurse-led education), imaging, if needed, as well as informed consent and should ideally be completed in one day prior to the day of the procedure.

Routine preoperative laboratory testing is not advised for healthy low-risk ambulatory patients.[48] Routine complete blood count, metabolic panel, and coagulation are not supported by outcome evidence in this population.[48,49] Thus, testing should be targeted to clinical indications and comorbidities and should be ordered when clinical history, physical exam, comorbidities, medications, local practice, or the planned procedure make results likely to affect perioperative care. The United Kingdom National Institute for Health Care and Excellence (NICE), European Society of Anaesthesiology (ESA), and American Society of Anaesthesiologists (ASA) have all stated that routine preoperative testing is not supported by evidence. Testing is supported only when clinical indications are present. The ASA characterizes prior results up to 6 months as generally acceptable, but finer timing should be individualized to patient stability and whether results will change management. Laboratory tests may include (especially in elderly or comorbid patients and patients on anticoagulation) red blood cell count, renal function, natriuretic peptides, thyroid function, and inflammatory markers. Electrocardiogram (ECG) evaluation should confirm

Table 3 Type and strength of supporting evidence

Type of supporting evidence	Strength of supporting evidence	Icons
Published data 	>1 high quality RCT Meta-analysis or high-quality RCT	
	High quality RCT >1 moderate quality RCT Meta-analysis or moderate quality RCT	
	High-quality, large observational studies	
Expert opinion 	Strong consensus >90% of the WG supports advice	
	Consensus >70% of the WG supports advice	

RCT, randomized controlled trial; WG, working group.

Table 4 Proposed criteria favouring same-day discharge (SDD) or overnight stay (ONS) during preprocedural assessment

	Criteria	Comments
Criteria favouring SDD	Patient consent	Advantages and disadvantages of SDD should be discussed with the patient, and patient needs to understand the entire SDD pathway and potential complications
	Available social support	Necessary for transport and basic assistance at home
	Proximity of patient's home to a hospital	Access to medical care in case of postprocedural complications necessary
Criteria favouring ONS	Decompensated heart failure, NYHA III-IV	Associated with higher peri- and postprocedural complication risk
	Significant pulmonary disease	Associated with higher peri- and postprocedural complication risk
	Severe obesity e.g. BMI >35	Associated with higher peri- and postprocedural complication risk
	Severe untreated obstructive sleep apnoea	May predispose to peri- or postprocedural complications in case of deep sedation
	Recent bleeding or unstable anticoagulation	May complicate postprocedural haemostasis
	Acute renal failure	Associated with higher peri- and postprocedural complication risk
	Significant mental or physical impairment and/or unstable comorbidities likely to require acute management post procedure	May complicate postprocedural workup

rhythm and conduction intervals, while additional tests are reserved for specific clinical indications. Imaging such as echocardiography or vascular ultrasound (US) may be appropriate for procedural risk anticipation.

Medication reconciliation is critical, especially for anticoagulants, antiplatelets, and drugs influencing cardiac conduction properties or renal function. Peri-procedural anticoagulation should follow guideline-based management. Patient education and informed consent are equally important during preprocedural assessment, including counselling on procedural expectations, warning signs, and post-discharge instructions. Comprehensive information about all aspects of the procedure and the SDD workflow should be given to the patient and his caregiver before admission, as the patient may have limited capacity to absorb

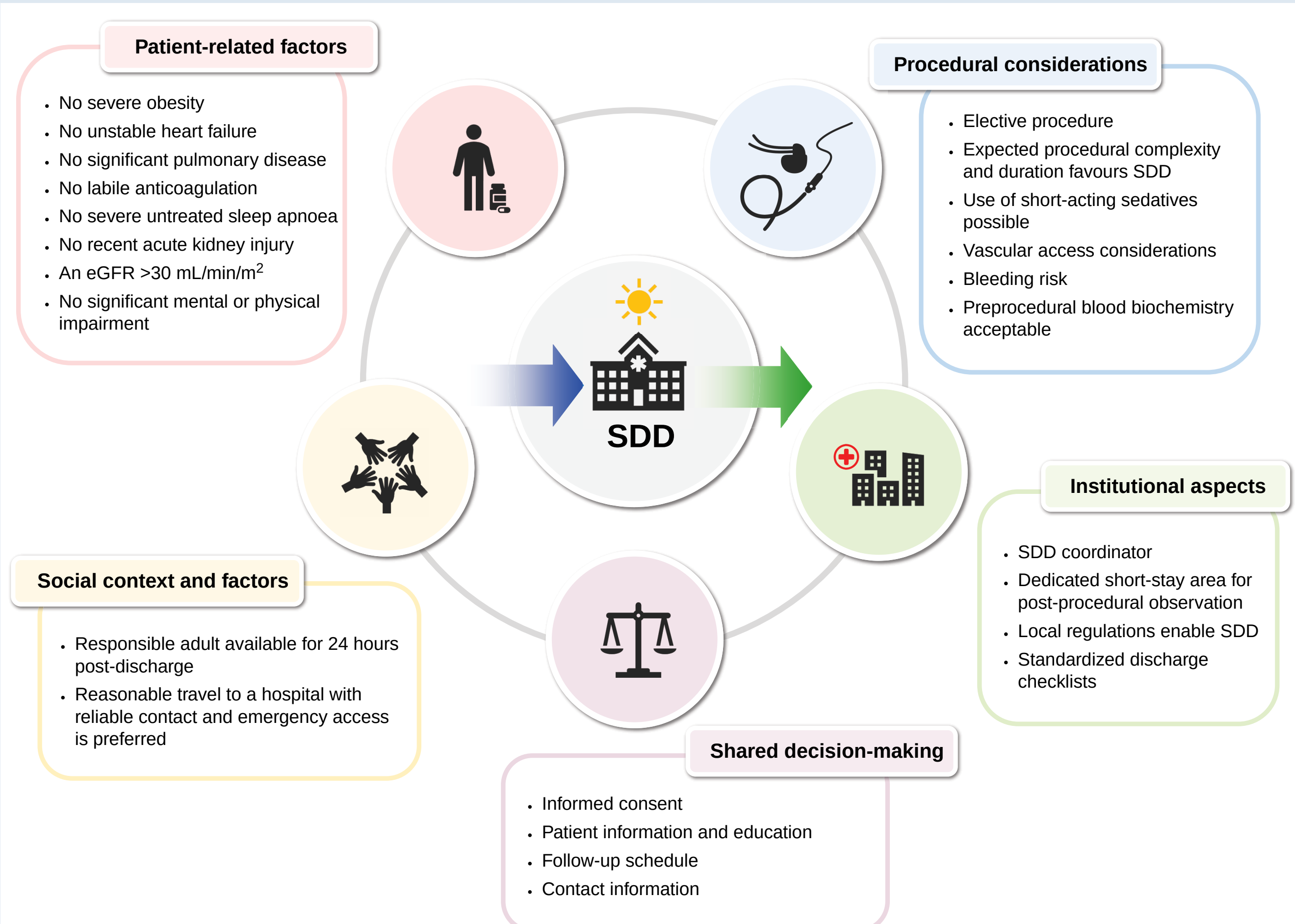

Figure 2 Considerations when planning or implementing SDD EP and CIED procedures including patient-related factors, social context, procedural considerations, institutional aspects and shared decision-making. BMI, body mass index; SDD, same-day discharge; TLE, transvenous lead extraction; VT, ventricular tachycardia.

detailed information in the post-op state. Organization of appropriate social support may be difficult if addressed too late. In addition, time constraints in the post-procedural setting may limit the opportunity to adequately discuss all necessary points.

Institutions should employ structured SDD checklists covering patients' pre-assessment, procedural workflows, complication management, access-site integrity, device/rhythm assessment, anticoagulation, and post-discharge instructions. Anticoagulation and social clearance will improve safety and efficacy.[4]

Procedural considerations

Standardized SDD protocols rely on procedural optimization. Key factors include anaesthesia type, procedural duration and complexity, vascular access and haemostasis management, periprocedural anticoagulation, and early recognition of complications (*Table 5*).

Sedation

Most CIED implantations and diagnostic EP procedures, as well as SVT and premature ventricular contraction (PVC) ablations, can be performed under local anaesthesia or conscious or deep sedation. Depending on local regulations, deep sedation may be administered with or without the presence of an anaesthetist. The EHRA Practical Guide on Optimal Implant Techniques for CIEDs proposes that anaesthetic support should be available for analgesic, haemodynamic, or respiratory assistance when required.[47] Procedural sedation and analgesia are more common in ablation procedures due to the need to relieve anxiety, discomfort, and pain. There are examples of SDD being performed safely under local aesthesia, sedation,[7,45,50,51] or general anaesthetic.[12,17,24,25,34,36,52,53] All three approaches appear to be safe and effective, and the choice of the approach should be determined according to local practice and the patient's requirements.

Considerations for catheter ablation procedures

SVT and PVC ablation

The type of arrhythmia determines procedural duration, complexity, and risk. SVT ablations are typically less complex and carry a lower complication risk than AF or ventricular ablations. Left-sided procedures, requiring anticoagulation and transseptal or retrograde aortic access, often take longer and are associated with a higher risk. In a Canadian registry of >16 000 SVT ablations (2011–2020), including 8% with transseptal access, the

Table 5 Procedural considerations

Procedural aspect	Potential barrier	Clinical implications	Comments
Sedation	Local anaesthetic (LA) vs. general anaesthetic (GA) LA[a]: alternative to sedation in most CIED procedures and EP procedures such as diagnostic EP studies, SVT, and PVC ablations Sedation or GA[a]: for most AF ablations, complex ablations, complex CIED procedures or TLE, or if preferred by the patient.	LA is more conducive to SDD. The decision to offer patients GA may be influenced by patient choice, anxiety and procedural complexity	Short-acting medication for deep sedation such as propofol + remifentanil or dexmedetomidine + remifentanil may be appropriate
Complexity and complication risk of the procedure Procedure duration	Complex procedures that carry a higher complication rate such a complex left atrial tachycardia ablation, VT ablation in structural heart disease or heart failure with reduced ejection fraction and transvenous lead extraction (TLE)	The complexity of procedure and procedural times may impact on safety of SDD. Long procedure times may lead to decompensation in vulnerable patients, requiring further observation or intervention pre discharge.	Long procedure duration may favour ONS
End of the procedure	Define the time of end of the last SDD procedure that still allows for the minimum post-procedure observation time	Late finish times may impact on the requisite observation period required for SDD resulting in ONS	
Vascular access site management	EP: Perform US-guided puncture as default strategy CIED: Perform cephalic vein cutdown or US-guided axillary vein puncture for transvenous leads as default strategy; US-guided femoral vein puncture for LLP	US-guided vascular access reduces the risk of complications and increases confidence for SDD. Axillary puncture or a cephalic cutdown reduces the risk of a pneumothorax and thereby facilitates SDD with early post procedure CXR review	
Vascular closure management	Protamine administration may be appropriate Figure-of-eight suture or VCD to reduce time to haemostasis, time to ambulation and time to discharge eligibility may be appropriate	Active reversal of Heparin reduces the risk of bleeding. The use of VCD and figure-of-eight sutures increases confidence in ongoing haemostasis, thereby facilitating SDD	Implement standardized bedrest protocols for EP (minimum of 1 h for VCD and 3 h for figure-of-eight suture)

EP, electrophysiology; GA, general anaesthesia; LA, local anaesthesia; LLP, leadless pacer; PVC, premature ventricular contraction; ONS, overnight stay; SDD, same-day discharge; TLE, transvenous lead extraction; US, ultrasound; VCD, vascular closure device; VT, ventricular tachycardia.
[a]Decision may depend on local regulations and varies by country.

rate of SDD (performed in 12 789 ablations) increased from 61% in 2011 to 91% in 2020, with similar 30-day emergency room visits and mortality compared with ONS. Variation in SDD practice was largely hospital-level factors.[54]

In the USA, a review of the Centers for Medicare and Medicaid Services (CMS) claims for the year 2022 showed low inpatient admission after SDD for SVT ablation (0.8–0.9% within 1 day and 4.7–9.9% within 30 days) as well as AF and VT ablations (1.3% admission within 1 day and 6.8–6.4% within 30 days).[21] A 2023 physician survey reported SDD in 90% of right-sided SVT/Atrial flutter, 80% of right-sided PVC, 62% of left-sided PVC, and 76% of AF/left-sided SVT or flutter ablations.[55] This has been confirmed by a recent single-centre US study, which showed the feasibility of SDD after right-sided and left-sided PVC ablation in 56% of patients, with very low 30-day complication rates. PVC ablation in patients without structural heart disease e.g. outflow tract PVC (especially right-sided) and SVT ablation resembles in complexity and safety and are both suitable for SDD. Conversely, the 2023 EHRA survey found much lower rates in Europe—18% right-sided, 11% left-sided, and 6% AF ablations—likely due to reimbursement models favouring ONS, but not due to procedural constraints.[8]

AF ablation

SDD after AF ablation has been extensively evaluated, as reviewed in the 2024 EHRA/HRS/APHRS/LAHRS expert consensus statement.[3] Large registries and meta-analyses consistently show no difference in early or 30-day complications or readmission rates between SDD and ONS. Based on several observational and two small randomized controlled trials (RCT) (*Table 1*; Supplementary material), SDD after AF ablation was considered reasonable in appropriately selected patients.[3,4] A recent meta-analysis from 2024 which included two small RCTs reported 2% short-term and 30-day complication rates, 4% readmission, and 0% 30-day mortality, with no difference between SDD and ONS.[4] Similar results were found in a recent large US AF registry, with major and overall complication rates of 0.7% and 2.1%, respectively.[16] Pulsed field ablation (PFA) has been associated with shorter procedure times while maintaining comparable safety and efficacy to conventional energy sources.[56–59] These findings will likely further drive worldwide adoption of SDD after AF ablation.[5]

VT ablation

Left-sided PVC ablation or VT ablation in patients with structural heart disease remains more complex procedures, particularly with left-sided origin, heart failure with reduced ejection fraction, or the need for epicardial access. Current data on SDD remain limited for patients with structural heart disease or heart failure undergoing VT ablation, and most patients will not qualify for SDD (see Preprocedural assessment section) as they require urgent or emergent intervention including intensive care unit and in-hospital treatment.[60] Therefore, VT ablation in these patients should preferably be performed as an ONS procedure. Most of these patients present as emergencies and are not comparable to the highly selected elective SDD patient cohorts reported in existing studies.

Best procedural safety practices in EP procedures

Regardless of the arrhythmia type, general procedural safety principles apply to both SDD and ONS and should not differ. Since vascular events remain the most frequent early complications, prevention through optimized vascular access and haemostasis management is essential. These aspects were recently reviewed in the *EHRA/EAPCI Clinical Consensus Document on Vascular Access and Closure Management for Electrophysiological Interventions*.[61]

Observational studies and meta-analyses have demonstrated that US-guided vascular access significantly reduces complications during EP procedures.[61–65] The current EHRA/HRS consensus advises US-guided access for AF ablation to minimize vascular complications.[61] In line with the 2025 EHRA/EAPCI consensus,[3,66] US-guided venous and arterial access is proposed as standard in all diagnostic and ablation procedures.

Adequate haemostasis is critical for reducing vascular complications and enabling early discharge, measured as time to discharge eligibility in current studies. Available methods include manual or device compression, suture techniques, as well as active and passive vascular closure devices (VCDs).[12,50,61,67,68] Especially for large (>10F) venous sheaths, commonly used in AF ablation, figure-of-eight or purse-string suture techniques, often secured with a knot or three-way stopcock, provide rapid haemostasis and earlier ambulation while avoiding prolonged manual compression. Arterial and venous VCDs shorten time to haemostasis, time to ambulation and time to discharge eligibility, reduce lab occupancy time compared to manual compression and figure-of-eight suture and improve comfort, all with complication rates comparable to manual compression.[34,50,61,67] Additionally, protamine administration may be appropriate for AF ablation, as it significantly shortens haemostasis and time to ambulation without increasing vascular or thromboembolic risk, although it carries a 1.2% risk of severe hypotension.[3]

CIED procedures

Indications

SDD can be safely implemented in the majority of CIED procedures. A large meta-analysis showed that SDD after CIED implantation—including pacemakers, primary prevention ICDs, CRTs, subcutaneous ICDs, and leadless pacemakers (LLP)—was associated with similar procedural complication, readmission, and mortality rates compared with ONS.[69] According to the 2022 CMS review summarized in the recent HRS/ACC scientific statement, inpatient admission after SDD was necessary in only 0.3% of pacemaker generator changes, 2% of dual-chamber pacemaker, and 1% of ICD implantations within 1 day, and in 5%, 7%, and 8%, respectively, within 30 days.[21] A 2023 US physician survey reported SDD in 95% of generator changes and 83–85% of new pacemaker and ICD implants.[55]

In contrast, the 2023 EHRA survey revealed considerably lower adoption in Europe: 62% for pacemaker and 49% for ICD generator changes, and only 10% and 12% for *de novo* pacemaker and ICD implantations, respectively.[8] Differences in reimbursement are potentially the main driver for the difference between North America and Europe.

A large study of 4543 CIED patients with 1557 (34%) undergoing SDD showed lower rates of complications and post-discharge acute care utilization.[27] The authors implemented an expedited discharge protocol that included a 2-h chest X-ray in two planes, device interrogation including remote monitoring setup, and a bedside post-operative evaluation. Patients with pacemaker dependency due to complete heart block, as well as those with secondary prevention ICD indications, were excluded. Proximity to the implant centre was identified as an additional factor for consideration by the implanting physician.

Patients who received CRT devices had lower rates of SDD (20%) than patients receiving pacemakers (36%) or ICDs (42%). This is likely related to the complexity and comorbidity of the patient, precluding early discharge. The SDD protocol implementation rate increased over time with 13% SDD in 2015 to over 71% SDD by the end of 2021. This suggests a change in perception of procedural risk and a progressive shift in clinical practice among implanting physicians.

In summary, any type of elective CIED procedure may, in principle, be appropriate for SDD after careful patient selection and assessment of procedural complexity and duration. Although SDD has been shown to be safe in patients undergoing primary prevention ICD implantation, there is currently no data regarding secondary prevention implantations and the extravascular ICD.[70] Patients with underlying complete heart block, who are often admitted as emergencies, have also been excluded from studies but may be suitable for SDD.

Transvenous lead extraction

TLE remains one of the most complex and highest-risk CIED procedures. Contemporary data show improved safety and efficacy, with <1.7% major procedural complications and 0.5% procedure-related mortality.[71] Outcomes depend on patient and lead characteristics, operator experience, and availability of immediate surgical backup. Identifying high-risk patients preprocedurally enables optimal planning and resource allocation. The ELECTRa Registry Outcome score (EROS), validated within the European Lead Extraction ConTRolled (ELECTRa) registry, assists in risk stratification and may be used as guidance for discharge planning.[72]

Table 6 Minimal observation periods after EP and CIED procedures according to published literature

Procedure	Observation period	Comments/ Checklist
Generator replacements (ICD, PM, or CRT)	1–2 h	• Pocket haemostasis ensured • Device function ensured
PM implant	2 h	• Haemodynamic stability • Pocket haemostasis ensured • Device function ensured • Chest X-ray performed
ICD or CRT implant	2–12 h[a]	SDD in cases of: • Strict eligibility criteria • Follow-up is available
Leadless pacemaker	2–6 h	• Access site haemostasis ensured • Device function ensured • Chest X-ray performed
Ablation procedures	3–6 h	• Low-risk patients, • Absence of pericardial effusion, no access site complications, • Neurological status screened
Lead extractions	12–24 h	Simple, uncomplicated extractions[b] may be suitable for SDD but not yet common practice

CRT, cardiac resynchronization therapy; ICD, implantable cardioverter defibrillator; PM, pacemaker; SDD, same-day discharge.
[a]Certain CIED patients may require longer observation periods, favouring overnight stay in such case.
[b]Refers to extractions without the use of specific extraction tools (excimer laser, mechanical rotating sheaths) and extractions for non-infectious indications.

A recent study demonstrated that SDD after TLE for non-infectious indications is feasible and safe in carefully selected patients following strict SDD protocols.[73] Exclusion criteria included: (i) late procedure completion (allowing <4 h post-procedure recovery, or <6 h for TLE finishing after 1 p.m.); (ii) unresolved anticoagulation issues; (iii) unsuitable social circumstances; and (iv) physician or patient concerns such as procedural complications, uncontrolled comorbidities, advanced age, or long travel distance.

Best procedural safety aspects (CIED)

Vascular access

Extrathoracic venous access—either axillary vein puncture or cephalic vein cutdown—is preferred over subclavian vein puncture for all lead-based CIED implantations regardless of SDD. Both extrathoracic and US-guided approaches significantly reduce pneumothorax, access-site complications, and lead-injury risk.[69] In a meta-analysis of 23 studies, subclavian vein puncture carried higher risks of pneumothorax and lead failure than cephalic vein cutdown, while cephalic vein cutdown and axillary vein puncture had similar complication rates.[74] This is especially relevant in SDD patients who may be discharged after a minimum of 2 h depending on the type of CIED implantation (*Table 6*).

For LLP implantation, the same principles apply as for ablation procedures. US-guided access is favoured over anatomical landmark guidance to minimize both major and minor complications and enable earlier ambulation.[61]

Haemostasis and infection prevention

Preventing local pocket complications such as bleeding, haematoma, suture dehiscence, and infections is crucial after any CIED procedure, particularly in patients eligible for SDD. Best practice advice on how to prevent CIED infections apply as per current EHRA international consensus document on how to prevent, diagnose, and treat CIED infections.[75]

Vascular closure in leadless PM procedures

Haemostasis management after femoral LLP implantation follows the same principles as those used for ablation procedures. Use of VCDs has been reported as safe, with no major vascular complications and allows early mobilization to facilitate SDD.[76,77] A retrospective analysis of 77 patients suggests that purse string suture is a safe option for access-site closure. A randomized trial comparing percutaneous closure vs. figure-of-eight suture is ongoing (PERCLOSE-LP, NCT06837870). In SDD LLP procedures, implantation via the right jugular vein may be appropriate as an alternative as it has been shown to be safe and may facilitate SDD.[78] A prospective multicentre registry evaluating the feasibility and safety of SDD after LLP implantation via the right jugular vein is ongoing (VAMPIRE, NCT06455566).

Early complication recognition and management

A detailed overview of early complications and their management can be found in the recent EHRA/HRS/APHRS/LAHRS consensus statements on ventricular arrhythmia ablation, CIED procedures, and AF ablation.[3,47,66,75] In the context of SDD, prompt identification and treatment of anaesthesia- and procedure-related complications are essential.

Anaesthesia-related complications

Early detection and management of periprocedural sedation and analgesia-related complications, such as respiratory depression, airway obstruction, allergic reactions, hypotension, hallucinations, and postoperative nausea or vomiting, are crucial. A minimum 30-min post-procedure observation period is advised after any level of sedation, including non-invasive blood pressure, ECG, and pulse oximetry monitoring, supplemented by continuous visual observation by trained nursing staff.[79] Discharge criteria should minimize the risk of post-observation cardiopulmonary depression. From a sedation standpoint, patients may be discharged when mental status and physiological parameters have returned to baseline, and pain is adequately controlled.[79] Patients should be discharged on adequate oral pain medication to avoid pain on the way home or at home after wearing off of local anaesthesia, if applied.

Ablation procedure-related complications

Access-site complications remain the most common periprocedural events and require early recognition and diagnosis by USA or contrast computed tomography (CT). Major vascular complications include inadvertent arterial puncture, arteriovenous fistula, pseudoaneurysm, haematoma, retroperitoneal bleeding, and infection. Management includes compression, thrombin/collagen injection, interventional therapy (coil embolization, stenting), or surgical therapy.[61]

Post-procedural hypotension, unexplained sinus tachycardia, or chest pain warrant prompt 12-lead ECG and transthoracic echocardiography (TEE).[3,66] Following PFA, life-threatening delayed myocardial ischaemia (caused by coronary spasms) or malignant arrhythmias are extremely rare but may occur with marked delayed (up to 240 min after the procedure, one sudden cardiac death after 22 days).[80–83] Chest pain, ST elevation or ischaemic ECG changes, haemodynamic instability, bradycardia, and ventricular arrhythmias are potential signs of late coronary spasms. Cardiac tamponade, which occurs more frequently after AF or VT ablation, is typically managed by percutaneous subxiphoid drainage and administration of protamine; persistent bleeding suggests major perforation requiring surgery.[3,66]

CIED procedure-related complications

Early CIED-related complications, as outlined in the EHRA Practical Guide on Optimal Implant Techniques for CIEDs, include pneumothorax, cardiac perforation, pericardial effusion, tamponade, pocket haematoma, infection, and lead dislodgment.[47] According to a large observational cohort, most of these complications can be diagnosed within 6 h after the procedure, and only a minority arises within 6–24 h post-procedure, suggesting limited safety benefit of ONS. After lead implantation, a post-procedure two-plane chest X-ray is advised to exclude pneumothorax and lead dislodgement.[69] Pocket haematomas are usually treated conservatively, though severe cases may require surgical revision.[69]

Post-procedure observation and discharge criteria

Careful post-procedural observation is vital to ensure patient safety and confirm continued SDD eligibility (*Figures 3* and *4*). Standardized protocols should be used to assess haemostasis, monitor patients, determine discharge readiness, and arrange appropriate follow-up. Observation protocols including checklists should be tailored to specific procedure types (EP or CIED) to effectively capture potential complications (*Tables 7* and *8*). However, defining minimum observation period, particularly after catheter ablation and CIED procedures, requires balancing patient safety with healthcare efficiency.[4,21,46,47,84] Suggested minimal observations time after EP and CIED procedures are summarized in *Table 6*.

Social support plays a crucial role in ensuring that patients have access to assistance with transportation, post-procedure care, monitoring during recovery, early identification of complications, and assistance with daily needs and activities, whether at home or in a recovery setting. As stated above, social support should be confirmed preoperatively and prior to discharge. In the REAL-AF registry study, social factors accounted for 70% of cases where patients initially scheduled for SDD ultimately required ONS.[17]

Specific considerations after EP procedures

Vascular access-site management (see Procedural considerations section) and complete haemostasis after sheath removal is a critical step in enabling SDD, as access-site complications remain the most common adverse events following EP procedures (*Figure 3*).

There is significant variation in local protocols regarding post-procedure vascular access monitoring, which directly influences the duration of bedrest. In a registry of 2628 AF ablations, patients were monitored for at least 4 h. Vascular US was performed in all patients, and only 0.5% bleeding or haematoma incidence was reported after discharge following a predefined nurse-led pathway.[85] Another study demonstrated SDD feasibility in 79% of patients, using manual pressure for at least 10 min and up to 3 h of bedrest, with bleeding in 0.3%.[25] Freedman et al. found no difference in adverse events between 3- and 6-h bedrest following figure-of-eight closure, though shorter bedrest showed a nonsignificant increase in bleeding (15% vs. 8%).[36] Based on current evidence, one to three hours of bedrest following figure-of-eight suture and one hour following VCD are minimally advised (expert consensus).

Nurses or physicians should assess the access site for bleeding, swelling, firmness, or pain in the recovery room and prior to discharge. Inspection, palpitation, and auscultation of the puncture site are essential, as it can detect new vascular murmurs indicative of pseudoaneurysm or arteriovenous fistula. Vascular US is optional but advised in case of abnormal findings.

There should be a protocol in place to rule out clinically relevant pericardial effusion. Relevant PE often develops during or shortly after the procedure. Haemodynamic compromise especially during ambulation raises concerns and warrants TTE. Whether a routine TTE strategy[12,26,34,45,50,51,85] increases safety in SDD procedures compared to selective TTE strategies[22,25] based on clinical indications (such as procedural complications, patient symptoms including chest pain, dyspnoea, hypotension, or high-risk procedures) remains unclear due to the absence of clinical trials. Given that a TTE is a non-invasive, fast, and inexpensive test that does not harm patients, and considering the potential severe consequences of missed pericardial effusion, centres may reasonably consider either approach: performing a routine predischarge bedside TTE, as done by many centres, or implementing a selective TTE strategy with careful clinical monitoring and low threshold for imaging in symptomatic or high-risk patients. Intracardiac echocardiography, when used during the procedure, may serve as an alternative for immediate post-procedure assessment of the pericardium.

Specific considerations in CIED procedures

Post-procedural observation after CIED procedures must ensure proper device function, pocket haemostasis, haemodynamic stability, and absence of pneumothorax. Patient observation without continuous electrocardiographic monitoring proved to be feasible and safe (*Figure 4*).[28] Setup of predischarge remote monitoring may assure additional safety by providing immediate

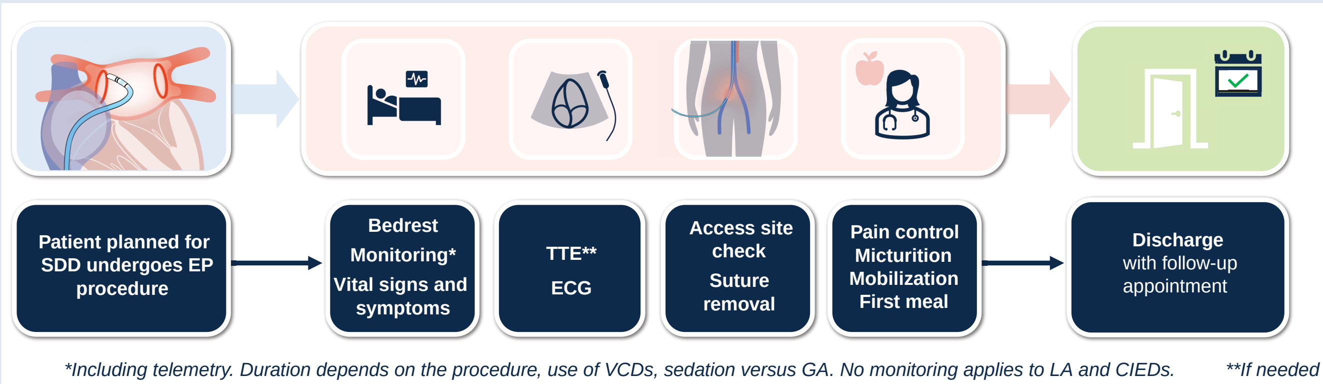

Figure 3 Post-discharge workflow for SDD EP procedures. ECG, electrocardiogram; EP, electrophysiology; GA, general anaesthesia; SDD, same-day discharge; TTE, transthoracic echocardiography; VCD, vascular closure device.

remote surveillance for patients at risk, complementing what was previously sole hospital-based surveillance.[21]

For simple generator replacements, short observation periods of 1–3 h are generally advised as safe before discharge.[28] For single- or dual-chamber pacemakers and primary prevention ICD, 2–6 h of observation are commonly reported.[28,47,70,86] Data on conduction system pacing (CSP) and SDD are limited. However, a study including 30 patients demonstrated that SDD was safe following concomitant CSP implantation and AV node ablation performed via the axillary vein.[87] Although CRT device implantation accounts for a relatively small proportion of reported cases, available data suggest that it can be safely performed in the context of SDD. While LLP implantation via the jugular vein has been described and may offer advantages for SDD, expert consensus indicates that SDD is also feasible after femoral access with an appropriate observation period of at least 6 h. (*Table 6*).[78,88]

By contrast, lead extractions remain high-risk interventions, and an extended in-hospital observation is currently the clinical routine. Although recent reports indicate that SDD after uncomplicated extractions such as extractions without the use of specific extraction tools (excimer laser, mechanical rotating sheaths) and extraction for non-infectious indications may be safe, this is not yet standard practice.[73]

Postprocedural care after CIED procedures in SDD patients is advised to include a minimum observation time of 1–6 h (depending on the procedure and the type of sedation), device interrogation, two-plane chest X-ray, wound check, and optionally inclusion in remote monitoring.

General considerations in EP and CIED procedures

The in-hospital post-procedural observation period should be sufficient to rule out complications requiring medical interventions. In the context of AF ablation, most acute complications manifest within the first 6 h after the procedure.[89] Some rare complications may occur delayed after several days or weeks, e.g. atrio-oesophageal fistula, immunologically mediated pericardial effusion, and may be missed even in an ONS strategy. Thus, a 4-to-6-h window of observation may be safe after all uneventful procedures, including those using transseptal puncture and left-sided ablation (except VT ablation). For CIED procedures, the suggested observation periods range from 1 h after generator replacement, 2 h after conventional transvenous implantation or jugular LLP implantation, to up to 4 to 6 h following LLP from the groin (*Table 6*).

During monitoring and before discharge, patients should demonstrate a stable rhythm and vital signs, complete haemostasis without signs of vascular access-site complications, and no apparent cardiovascular or non-cardiovascular actionable symptoms. Patients must be fully awake with successful mobilization, tolerate oral intake, and achieve spontaneous micturition. Urinary catheter should be avoided, if possible, or removed as early as clinically feasible. Monitoring of spontaneous voiding is obligatory after use of urinary catheters, in older men and those with known prostatic disease or dysuria. Especially in EP procedures, a removal of the figure-of-eight suture must be ensured or planned to be undertaken during an ambulatory FU visit or by the referring physician/the general practitioner. In case of CIED implantation, device interrogation should be performed prior to discharge to exclude lead dysfunction or dislodgement. The patient and caregiver must have received post-discharge instructions and behavioural advice in the preoperative setting (See Patient education and communication section). These instructions should include comprehensive instructions as to potential signs and symptoms of procedural complications that require immediate presentation at the ablation or implantation centre, including emergency contact details, and should be recapped with the patient before discharge. A short-term follow-up appointment should be scheduled, either at the referring physician/centre, or, if needed at the ablation/CIED centre, depending on local follow-up facilities and patient- and procedure-specific factors (see Post-discharge follow-up section). Institutions, especially ambulatory surgical centres (ASC), should establish fast-track re-entry pathways in case of complications.

Patient education and communication

Patient education and post-discharge considerations for SDD procedures

Patient education and communication including clear and structured discharge instructions are essential both to enable SDD procedures and to guarantee safety. It should be adapted on a case-by-case basis to ensure correct understanding by the patient and his/her caregiver or informal carers, if appropriate.

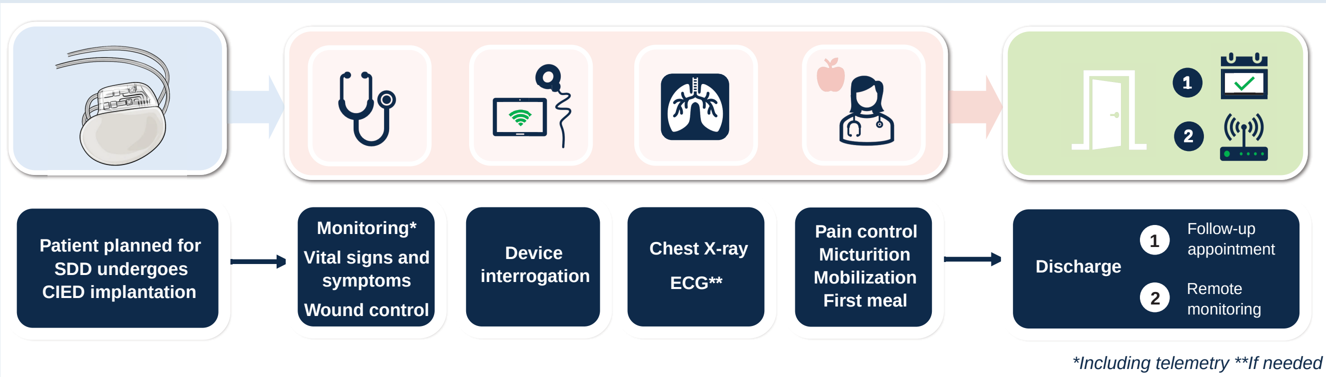

Figure 4 Post-discharge workflow for SDD CIED procedures. CIED, cardiac implantable electronic device; ECG, electrocardiogram; SDD, same-day discharge.

Table 7 Checklist. Postprocedural checklist after catheter ablation procedures

Information about the procedure	Did any complications occur during the procedure?	Yes	No
	Was the CIED procedure successful?	Yes	No
Information Post-procedure observation unit	Any arrhythmia during the post-procedural observation period (e.g. tachy- or bradyarrhythmias); Patient haemodynamically stable and absence of discomfort? Transthoracic echocardiography performed (if needed)?	Yes	No
	Any other complications during the post-procedural observation period (e.g. exacerbation of the underlying heart disease, high blood pressure, volume overload, high or low glucose levels)?	Yes	No
	Vascular access uneventful?	Yes	No
	Vascular access site closure has been removed before discharge or follow-up for ambulant removal scheduled if necessary?	Yes	No
	Is the patient fully awake? Successful mobilization? Oral intake and spontaneous micturition possible?	Yes	No
Information on post-discharge behaviour	Discharge instructions provided to patient and caregiver, including monitoring the vascular access site, post-interventional physical behaviour, providing emergency number?	Yes	No
	The patient has been informed about his medication especially post-interventional anticoagulation management, and a prescription was handed out?	Yes	No
	Adequate social support has been confirmed	Yes	No
	A follow-up appointment has been organized	Yes	No
	Physician concludes that same-day discharge is reasonable	**Yes**	**No**
(additional notes by the physician)			

The caregiver should be well-informed and comfortable with SDD as part of procedural planning. The 2021 EHRA expert consensus statement and practical guide on optimal implantation technique for conventional pacemakers and ICDs underlines the importance of providing patients with written, personalized information materials in simple, clear language and always checking that the patient and, if possible, his/her caregiver understand the information (*Figure 5*).[47] This is particularly important for patients with language barriers. Key components of instructions include «red flags» (i.e. alert signs) that should prompt the patient to contact their specialist centre immediately (*Table 9* and *Figure 5*).

Contact points and after-hours support: Even with extensive discharge instructions correctly understood by the patient, contact and support after discharge are crucial to safety and patient confidence.

Designated contact line/nurse/EP team: Many studies and guidance protocols require a dedicated phone number (often nurse-led) for patients to use in the first 24(–72) hours. This line should be staffed by medical personnel with procedural familiarity, able to assess and triage symptoms and escalate care to the emergency physician as appropriate.

After-hours/emergency escalation: 24-hour access to on-call physicians, hospital switchboard, or emergency department, with clear instructions on which symptoms warrant immediate presentation e.g. colour-coded, should be provided. While dedicated 24/7 hotlines for SDD patients represent an ideal standard, current practice patterns at experienced SDD centres and

Table 8 Checklist. Postprocedural checklist after CIED surgery

Information about the procedure	Did any complications occur during the procedure?	Yes	No
	Was the device intervention procedure successful?	Yes	No
Information from post-procedure observation unit	Other complications during the post-procedural observation period (e.g. exacerbation of the underlying heart disease, high blood pressure, volume overload, high or low glucose levels etc.)? Patient haemodynamically stable & absence of discomfort?	Yes	No
	CIED pocket site is unremarkable? No signs of relevant haematoma or swelling?	Yes	No
	Has the CIED been interrogated? Remote monitoring active?	Yes	No
	Has a chest X-ray been performed, if necessary?	Yes	No
	Is the patient fully awake? Successful mobilization? Oral intake and spontaneous micturition possible?	Yes	No
Information on post-discharge behaviour	Discharge instructions provided to patient and caregiver, including wound care postinterventional physical behaviour, and an emergency number?	Yes	No
	Wound care instructions and suture removal instructions provided to the patient?	Yes	No
	The patient has been informed on intake of pain medication	Yes	No
	The patient has been informed about medication, especially post-interventional anticoagulation management, and a prescription was handed out	Yes	No
	Adequate social support has been confirmed	Yes	No
	A follow-up appointment has been organized	Yes	No
	Physician concludes that same-day discharge is reasonable	**Yes**	**No**
(additional notes by the physician)			

ambulatory surgery facilities (see Supplementary material online, *Table S2*) indicate that on-call physician coverage combined with emergency department access provides adequate management of acute complications. However, ASCs lacking on-site emergency departments and overnight beds must ensure patients receive explicit after-hour guidance and emergency contact information with clear escalation pathways.

Return/follow-up instructions: Patients must understand when and where scheduled follow-ups will occur (remote monitoring, phone call, in-clinic follow-up), and to whom they report if issues arise.

Patient engagement in the care pathway

Patient engagement is central to safety, satisfaction, and adherence in SDD pathways.

Pre-procedure selection and shared decision-making: Not all patients are suitable for SDD (Chapter 3). Shared decision-making between the physician/team who performs the procedure, and the patient (and informal caregiver) ensures that patients' preference and values are integrated.

Education and teach-back: Structured patient education combining verbal and written materials in both online and print formats, ideally incorporating the "teach-back" method (where patients repeat instructions to confirm understanding), has been associated with improved comprehension of discharge instructions, better recognition of warning signs, and reduced anxiety. SDD protocols may include pre-discharge demonstrations of device use or remote monitoring equipment, along with clear instructions on wound care and symptoms requiring immediate attention.

Social support and logistics: Engagement includes planning for post-discharge support, such as identifying who will be with the patient after discharge, arranging transportation home, ensuring the ability to call for help if needed, confirming medication supply, nurse at home for wound care in special situations (old, frail patients) and setting up remote monitoring. Patients require a responsible caregiver to provide overnight assistance, particularly in cases involving analgesia use, early mobilization requirements, frailty, or if symptoms emerge. Patients must be informed about driving restrictions that generally apply following ablation or CIED procedures.

Patient satisfaction, preference, and psychological readiness: Patients may prefer SDD (due to comfort at home, reduced disruption, lower hospital-associated risks) provided they feel safe. However, some may feel anxious about leaving the hospital early. This underscores the importance of clear instructions, contact support, and reassurance.

Post-discharge follow-up

Short-term follow-up after SDD

While no evidence-based data exists supporting an additional short-term follow-up (FU appointment on top of the patient's regular FU) following SDD after EP or CIED procedures, such an appointment may be reasonable in certain patients to ensure early detection of complications, confirm procedural success, reduce unnecessary readmissions and emergency visits, and provide patient education and reassurance, especially for centres which start to implement SDD. Options to carry out short-term FU are in-person, remote, or hybrid-FU, combining an in-person FU and a remote FU via telemedicine. This process may be conducted by centres performing SDD programmes or by referring/primary care centres/physicians, or nurses, depending on local clinical practice, logistical capabilities, and local regulations.

Short-term FU within the first days aims to identify delayed complications, assess symptom evolution, confirm procedural success, and reinforce post-discharge instructions. It remains unclear whether any type of additional short-term FU is necessary or improves safety after straightforward, uncomplicated EP

EHRA
European Heart
Rhythm Association
European Society of Cardiology

Patient Discharge Information

Same-Day Discharge after a Cardiac Implantable Electronic Device Procedure

Hospital: ___________________

Date of Procedure: ____ / ____ / ____

Treating Physician: ___________________

Post-Operative Instructions

- Rest for the remainder of the day
- Keep the dressing clean and dry until complete wound closure
- Avoid lifting heavy objects (>5 kg) or raising the arm above shoulder level on the side of your device for **1–2 weeks** (unless told otherwise)
- Take prescribed medications as directed.
- Arrange for a responsible adult to stay with you for the first night.

Red Flags – Call Immediately if You Notice

- Increasing swelling, bleeding, or a rapidly enlarging bruise at the wound site
- Redness, warmth, pus, or fever >38°C
- Sudden dizziness, fainting, severe palpitations, or shortness of breath
- Any electric shock delivered by your defibrillator (if you have one)
- Severe or unexplained chest pain

If symptoms are severe or life-threatening, call Emergency Services (112) immediately

Contact Information

During working hours (08:00–18:00):

Cardiology Nurse Hotline – phone: _____________

After hours / weekends

Hospital Switchboard – phone: ______________ (ask for "On-call Cardiologist")

Figure 5 An example of a printable patient discharge information form with post-operative instructions, red flags, and contact information.

or CIED procedures, particularly since in-person FU is associated with higher costs and requires clinic resources, patient travel, and staffing. Although economic considerations and reimbursement should not be the primary drivers of clinical decisions, routine short-term FU in every SDD patient would diminish the operational and economic benefits of SDD pathways. Furthermore, mandatory early FU appointments may reduce patient acceptance of SDD as a convenient alternative to ONS. Current practice in centres performing predominantly SDD procedures (see Supplementary material online, *Table S2*) demonstrates the safety of omitting short-term FU in appropriately selected patients. Until then, based on expert consensus, short-term FU is not systematically needed for all SDD patients. The decision to schedule it and its timing may be individualized, considering the patient characteristics, procedural complexity, and risk, and therefore the decision to pursue additional early FU systematically or individualized may ultimately be based on local protocols for post-discharge surveillance. Elective percutaneous coronary intervention (PCI) and outpatient/ambulatory surgeries under general anaesthesia may serve as a validated framework when incorporating SDD for EP and CIED procedures. Overall, the importance of structured early follow-up is less clear.

The role of telemedicine and remote monitoring in SDD pathway

Integration of telemonitoring into post-discharge protocols offers the opportunity to optimize the post-discharge FU process by saving resources (staff, facilities) and increasing patient comfort through the elimination of unnecessary hospital and/ or clinic visits. Telemonitoring may consist of simple telephone remote post-discharge monitoring, an e-Health application including blood pressure and heart rate tracking for EP patients, or classic remote monitoring for CIED patients. While SDD workflows with integrated telemonitoring have been proven to be safe and effective in bariatric, colorectal, and orthopaedic surgery, evidence for SDD EP and CIED procedures remains limited.[90–96] Epinosa et al proposed a nurse-led SDD protocol for AF ablations featuring a next-day smartphone-based virtual visit, serving as a model for hospitals implementing SDD protocols.[26] Implementation of such models requires a dedicated cardiac nurse coordinator to provide instruction, organize FU, review alerts, and enhance communication with patients and caregivers. However, the value of telemonitoring as part of short-term FU or in lieu of in-person FU as well as the necessity for short-term FU itself in straightforward EP and CIED procedures remains unclear and is therefore not mandatory.

For CIED patients, remote monitoring is standard of care per the 2023 HRS/EHRA/APHRS/LAHRS Expert Consensus Statement.[97] This advice does not differ between SDD and ONS. While remote monitoring is well-established for long-term follow-up, its role in SDD is uncertain, as the only difference from ONS is one night of observation.

Management of complications and readmission

In-hospital observation or observation in ASCs varies by procedural complexity and institutional protocol (see Post-procedure observation and discharge criteria section, *Table 6*). For SDD suitable EP and CIED procedures, standardized SDD pathways typically include a postprocedural observation time of 2 to 6 h post-procedure with objective discharge criteria (*Table 10* and *Figures 3* and *4*).[25,73,88,98] Most major complications occur interprocedurally or within the first 4 to 6 h, making structured observation during this window critical for patient safety.[99] However, delayed complications may arise up to 7 days post-discharge in both SDD and ONS patients, which emphasizes the importance of patient education (see Patient education and communication section). Education of patients and caregivers on warning symptoms including a list of the most serious ones (see Patient education and communication section) is an integral part of SDD protocols. Active patient involvement, including wound inspection and screening for serious warning symptoms and side effects, may be beneficial to ensure safety and enable early intervention in case of complications. In appropriately selected patients undergoing SDD, complication rates are low, with major adverse events occurring in <2% of contemporary SDD cohorts.[17,52] Most complications are benign and resolve with conservative outpatient management such as small haematomas, trivial pericardial effusion, and small pneumothorax. However, serious complications such as cardiac tamponade, pneumothorax requiring drainage, or large pocket haematomas may require urgent invasive treatment at specialized centres with 24/7 interventional cardiology and optional cardiac surgery capabilities. Treatment of complications itself does not differ from those in ONS patients.

Early reports of high readmission rates (occasionally approaching 20–30%) after SDD procedures predated the

Table 9 Red flags and alert signs

Red flags and alert signs	Comments
Pocket/access site abnormalities	Dressings must be maintained, and any leakage, swelling, or change must be monitored and addressed as needed
Bleeding, haematoma	Expanding bruising, swelling, or drainage from the device pocket or the venous access site are among the most common early complications. Instructions should explicitly inform patients to look for increasing pain, swelling, or bruising, and not to ignore what might seem like minor bleeding
Neurological signs	Any neurological sign suggestive of stroke or transient ischaemic attack occurring after an EP or CIED procedure should prompt immediate activation of emergency medical services
Infection and systems signs	Brief or persistent fever, redness at the incision site, purulent discharge, malaise, or systemic symptoms are red flags
Unexplained dyspnoea	Unexplained dyspnoea due to pneumothorax, tamponade, volume overload, phrenic nerve palsy or pulmonary embolism
Pericardial-related symptoms	Patients should be advised of risks such as chest pain beyond expected post-procedure discomfort, shortness of breath, palpitations, or any symptom suggestive of pericardial tamponade
Other procedure-related symptoms	Symptoms such as syncope, dizziness, ICD shocks, or worsening heart failure may be suggestive of late complications (e.g. lead dislodgement) that are rare, but critical, or may be sign of an arrhythmia
Pain	Any unexplained pain that does not resolve with analgesic therapy should prompt consultation

Table 10 Proposed discharge criteria for same-day discharge following catheter ablation or device implantation

Criteria	Comment
Absence of procedural or post-procedural complications	EP: Stable rhythm /no clinically significant arrhythmia Echocardiography to rule out effusion (routine or selective strategy) CIED: Device interrogation confirms normal function with no evidence of serious arrhythmias and may optionally include immediate activation of remote monitoring Chest X-ray performed (after CIED lead implantations)
Haemodynamic stability	Vital signs acceptable for discharge
Successful ambulation	Patient mobilized, absence of concerning discomfort
Vascular haemostasis	EP: Ensure or plan removal of figure-of-eight stitch when appropriate, check for signs of access site complications (severe haematoma, bleeding), and consider vascular ultrasound in selected cases CIED: Removal of compressive draping as appropriate, check for haematoma
Post anaesthesia observation	Ensure control of post-anaesthesia nausea and ability of spontaneous micturition
Adequate pain control	Ensure adequate pain control and sufficient oral pain medication
Confirmation of social support	Ensure a designated person who can help with transport and/or recovery if deemed necessary
Comprehensive discharge instructions provided to patient and caregiver	Patient Instructions given for monitoring of possible postprocedural complications and new medications Provide contact information of the staff on call

CIED, cardiac implantable electronic device; EP, electrophysiology.

development of standardized SDD protocols with systematic patient selection and structured observation criteria. These high rates are not corroborated by recent systematic reviews and contemporary SDD programs using evidence-based protocols (see Supplementary material).[4,11,14,100,101] A recent meta-analysis of SDD after catheter ablation procedures revealed a rehospitalization rate of only 4% (95% CI 1–10%) with high heterogeneity.[4] The causes of unplanned medical visits included recurrence of arrhythmia, pericarditis or chest discomfort, vascular or bleeding issues, bradycardia, and respiratory complications. Importantly, SDD was not associated with a higher risk of unplanned medical contact than ONS (RR: 0.86). The same applies to SDD CIED implantations, which were not associated with higher pooled readmission rates when compared to ONS (pooled OR = 0.95, 95% CI: 0.74–1.21).

Institutional implementation

Successful adoption of SDD for EP and CIED procedures depends on a clear institutional structure that supports standardized workflow, predictable patient pathways, and institutional coordination. The following framework outlines the essential elements required to embed SDD into routine clinical practice (*Figures 6* and *7*).

Staffing models and procedural scheduling

Implementation of SDD requires well-organized staffing structures that ensure seamless transitions across all phases of care. Ideally, a designated SDD coordinator, preferably an experienced EP nurse, should oversee patient selection, workflow consistency, and communication between departments. Clear task allocation within the team and standard operating procedures are essential to maintain process reliability and support efficient throughput. Recent guidance from the Heart Rhythm Society and American College of Cardiology emphasizes that SDD is safe in appropriately selected patients and can expand access while improving operational efficiency, provided programs formalize infrastructure and governance.[21]

Procedural scheduling plays a central role. SDD candidates should be prioritized in early procedural slots to allow sufficient post-procedural monitoring and timely assessment of discharge criteria. Staggered case starts and parallel preparation zones reduce delays and minimize the risk of unplanned overnight admissions. Pre-procedure evaluations, including imaging, laboratory testing, medication review, and patient education, should be completed before the procedure day to maintain schedule integrity.

Cross-training of staff ensures that sedation management, vascular access preparation, haemostasis assessment, and post-procedural monitoring can be carried out reliably across team members. This flexibility enhances resilience and prevents interruptions in the SDD pathway. Utilizing US for access, meticulous activated clotting time (ACT) targeting, and consistent closure strategies (manual compression, figure-of-eight, or VCDs) enable early ambulation—often within 2 to 3 h—without increasing complications.[34,50,61,67] Thereafter, strict discharge criteria that allow SDD should be evaluated, ideally by the SDD coordinator (*Table 10* and *Figure 6*).[26]

Infrastructure and logistics for ambulatory workflow

The infrastructure required for SDD must support efficient flow without compromising safety. A dedicated day-care unit for preparation and post-procedural observation is advised. This area should provide telemetry monitoring, structured access-site evaluation, TEE and facilities for early ambulation and patient education.

Well-defined intra-hospital transport pathways are essential to avoid unnecessary delays between registration, the EP lab,

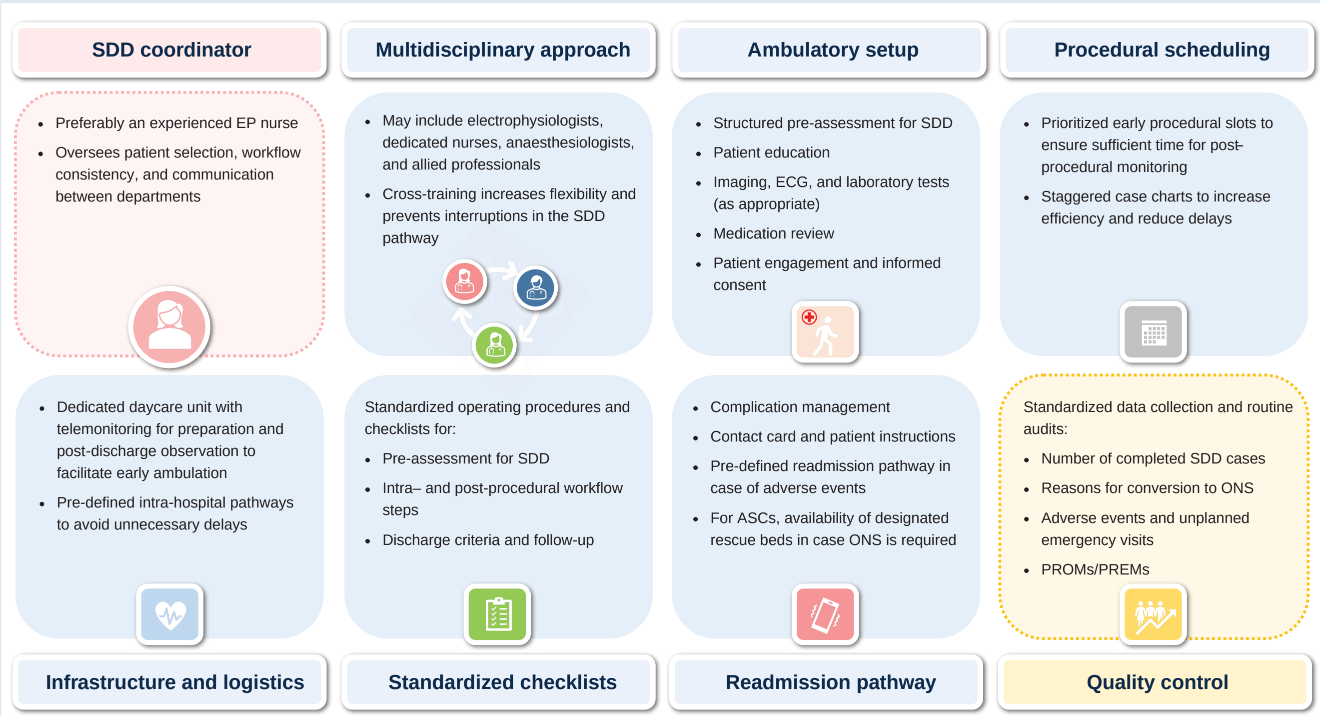

Figure 6 Institutional implementation of same-day discharge. KASC, ambulatory surgical center; ECG, electrocardiogram; EP, electrophysiology; ONS, overnight stay; PREM, patient-reported experiences; PROM, patient-reported outcomes; SDD, same-day discharge.

and the recovery zone. Consistent procedural logistics such as US-guided vascular access, standardized closure techniques, predefined catheter sets, and readily available equipment support predictable recovery times and reduce variability.

Digital infrastructure should include integrated checklists, standardized order sets, and automated timers to guide observation periods and assist in timely discharge. These tools support adherence to protocol and provide transparency within the care pathway.

Documentation, protocols, and audit tools

Standardized documentation is necessary to ensure reproducibility and quality control of SDD pathways. Institutions should maintain clearly defined standard operating procedures that describe each step of the process, from pre-assessment and intraprocedural workflow to discharge and follow-up.

Checklists for eligibility, procedural safety, post-procedural assessment, and discharge readiness reduce variability and ensure that all critical elements are addressed. Structured patient instructions should be provided before discharge and reviewed with the patient and their support person.

Quality monitoring is central to iterative improvement. Each institution should collect data on the proportion of completed SDD cases, reasons for conversion to overnight stay, time to ambulation, discharge time, readmissions, unplanned emergency visits, patient-reported outcomes (PROMs), and patient-reported experience measures (PREMs). Routine audits enable the identification of bottlenecks and support continuous refinement of the SDD pathway. Meta-analysis data indicate no increase in major complications vs. overnight observation when structured post-op monitoring is used.[4]

Multidisciplinary approach

SDD requires coordinated effort across interdisciplinary teams, including EP, anaesthesia, nursing, allied health professionals, administration, and, when relevant, remote monitoring teams. Regular interdisciplinary meetings ensure shared situational awareness, strengthen communication and collaboration, and maintain adherence to evolving protocols.[16]

Specialized EP nurses or AF nurses may contribute significantly by performing pre-assessments, patient education, post-procedural evaluation, and structured discharge instructions. Their involvement supports early recognition of complications and increases patient confidence in SDD.[102]

Patient engagement is an essential component (see Patient education and communication section). A direct contact pathway (telephone line or telehealth function) increases perceived safety and reduces unnecessary hospital contact.[103]

A supportive institutional culture characterized by leadership endorsement, transparent communication, and a shared understanding of SDD objectives is essential for long-term adoption.

European case studies and models of care

Core models of care for SDD procedures

There are four different core models of care that are in principle possible to implement SDD and that have been described in the literature.

(1) **'Default SDD' pathway in the EP lab**

The most straightforward (and arguably also most common) approach embeds SDD as the default for every low-risk

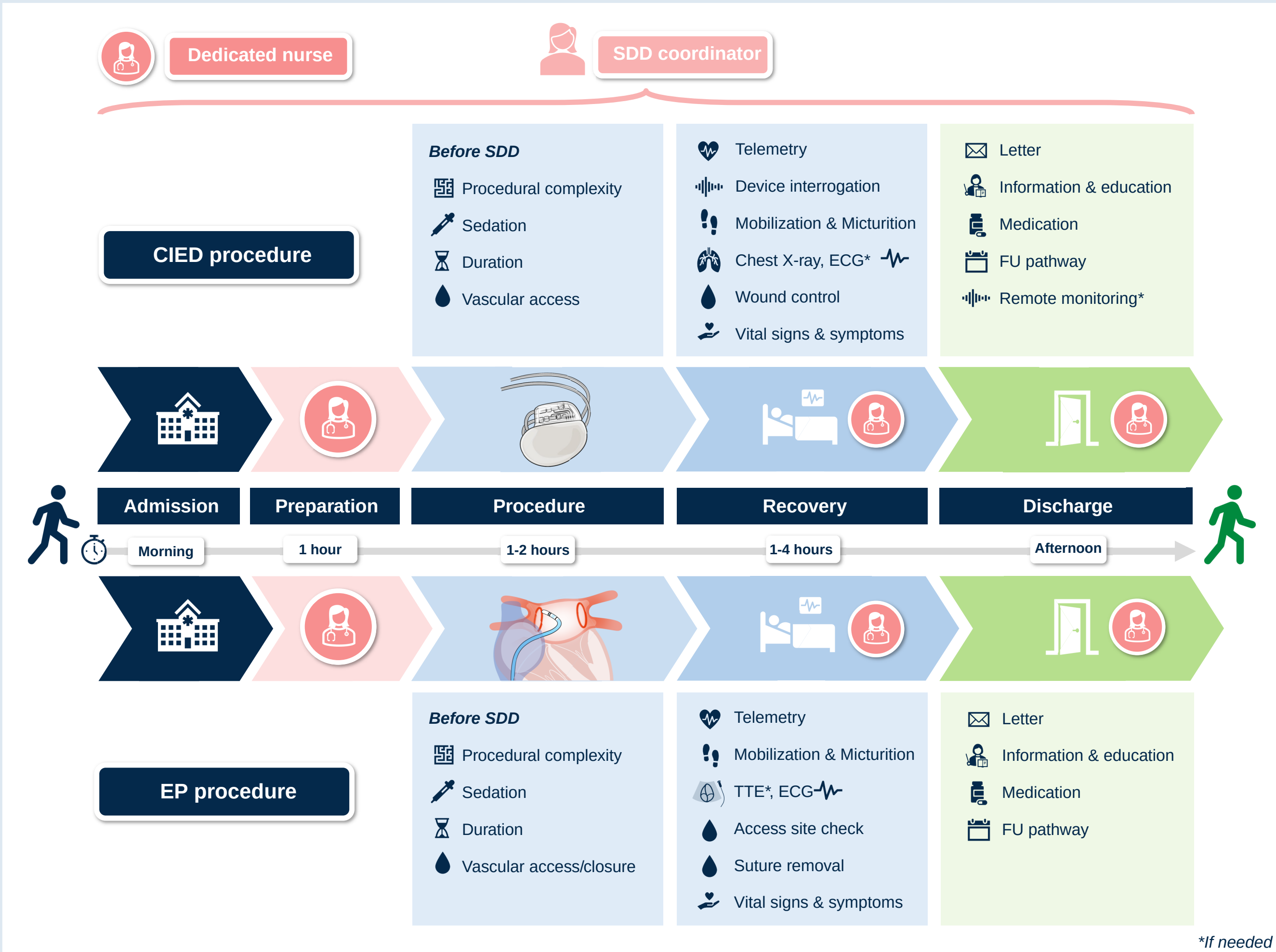

Figure 7 SDD workflow from pre-assessment to admission and discharge of the patient for CIED (top) and EP procedures (bottom). CIED, cardiac implantable electronic device; ECG, electrocardiogram; FU, follow-up; TTE, transthoracic echocardiography.

AF ablation (radiofrequency, cryo, PFA), with rescue admission criteria, and is managed by the same team managing the ONS pathway. Milestones are time to ambulation, voiding, oral intake, analgesia, anticoagulation checks, and scripted education. Meta-analysis reports no excess in major complications, re-hospitalization, or unplanned contact vs. ONS.[21]

(2) **Nurse-coordinated SDD program (allied health-led)**

A multicentre European implementation fully coordinated by an ambulatory cardiac intervention nurse demonstrated efficient SDD after AF ablation with negligible access-site events when US-guided puncture and protocolized haemostasis were mandated.[26]

(3) **Virtual ward/telehealth-enabled SDD**

Some centres pair SDD with structured next-day teleconsults and remote symptom monitoring. Experience from AF telehealth infrastructure (e.g. TeleCheck-AF) shows rapid scalability and patient acceptance, and it is easy to adapt for post-ablation surveillance.[104]

(4) **Ambulatory surgery/'out-of-hospital' centres (limited in EU)**

Outside the USA, payor and regulatory frameworks limit EP ablation in ASCs. Most EU SDD is hospital-based day-case care. However, US evolution shows increasing adoption of care pathways in ASCs, and it is reasonable to think some EU regions might implement these in the near future.

Examples of national adaptations of SDD and reimbursement pathways from the United Kingdom, Germany, France, and Belgium can be found in the Supplement in Supplementary material online, *Tables S2* and *S3*.

Barriers to adoption

First and foremost, many outpatient tariffs or Hybrid-DRGs are immature and can be burdensome with respect to documentation, which leads to hospitals preferring inpatient coding to avoid negative margins, especially when high-cost disposables (e.g. PFA) are used. Across Europe, misaligned reimbursement is a challenge (e.g. minimum ONS expectations, financial penalties for SDD such as inability to bill certain actions together on the same day, or inadequate ambulatory tariffs). This misalignment may represent a bigger barrier to implementation than clinical safety.

There is however also a measurable degree of medicolegal risk aversion that may be related to institutional culture. Surveys of European EP clinicians show SDD uptake is higher in tertiary/high-volume centres. Overall, the perceived risk of delayed complications and limited after-hours coverage are potential barriers to widespread implementation. These concerns are not necessarily data-driven, with a clear gap between perceived and actual risks, particularly for complications and rehospitalizations.[105]

Patient-level constraints and capacity bottlenecks outside the EP lab may exist. Anticoagulation complexities, frailty, obstructive sleep apnoea, long travel distances, and limited home support are common exclusion reasons. Patient selection strategies mitigate this, but some centres may treat a disproportionate number of patients with 'unfavourable' SDD profiles and may find themselves less successful in implementing SDD pathways as compared to other centres. Equally, logistical hurdles such as delays in recovery unit turnover, transport, and pre-discharge examination can be present outside the control of a particular centre wishing to implement SDD and can force intended SDD procedures to ONS.

Finally, the implementation of SDD may be influenced by socioeconomic and organizational factors, with potential differences between public and private healthcare systems across Europe. These differences are acknowledged as a limitation, though they are not the core focus of this document.

Facilitators and enablers

Routine US-guided femoral access, the use of VCDs, and disciplined ACT/haemostasis protocols reduce access-site issues and enable early ambulation. A recent EHRA consensus document proposes a simple stepwise approach.[61] Building on the near elimination of access-site complications by using such protocolized vascular access and closure strategies enables far more confidence in telehealth and remote monitoring. Reusing AF remote frameworks (TeleCheck-AF) for day 1/day 7 check-ins and symptom reporting maintains safety and satisfaction while avoiding hospital bed use. Additionally, an argument can be made for operational transparency as a tool for further elimination of patient and physician concerns regarding SDD pathways. Publishing SDD key performance indicators (intended SDD rate, achieved SDD, discharge time, 7/30-day ED visits) and running regular team briefings and updates facilitates problem-solving and builds confidence from all participants in the healthcare system. Guidance and editorials now explicitly position SDD as a system intervention, not just an early discharge decision.

Cost effectiveness

The implementation of SDD may enable healthcare providers to address the growing demand for ablations and CIED procedures. Above and beyond cost-effectiveness aspects, hospital authorities should be actively involved in the implementation of a SDD program. In terms of cost-efficiency, SDD has been shown to lower hospital expenditure and streamline workflows, though the drivers of economic benefit differ between EP and CIED procedures. A British study was able to demonstrate that the introduction of an early discharge protocol for CIED procedures reduced the mean post-procedural length of stay from 1.1 days to 0.54 days, translating into an annual saving of 280 bed-days and approximately £77 000 (about €89 000) for the centre, thereby demonstrating both the sustainability and operational optimization associated.[29]

With regard to catheter ablation, particularly AF ablation, a retrospective analysis of a large patient cohort in the USA revealed a significant reduction with SDD in mean patient costs—from $30 749 ± 16 383 to $25 237 ± 14 036 ($P < 0.01$).[106] Additionally, Zenger et al. performed a comprehensive analysis involving 310 patients undergoing AF ablation, showing that SDD was non-inferior to ONS regarding adverse clinical events and total system costs, with a trend toward improved PROMs.[107]

A recent EHRA survey confirmed widespread implementation of SDD among European centres (78%) after the Covid-19 pandemic, emphasizing perceived improvements in resource use, cost-effectiveness, and patient flow—particularly in university and high-volume centres.[105] SDD protocols did not negatively impact 30-day hospital readmission rates, an important measure of costs and clinical quality, while they reduced the consumption of hospital resources, allowing for reallocation of beds and thereby reducing hospitalization costs. Non-randomized trials and meta-analysis have further corroborated the cost-effectiveness and safety of SDD, reporting resource cost reductions of up to 63% and annual savings that may exceed hundreds of thousands of dollars based on local case volume and protocol adaptation.[4,51,106]

In summary, healthcare systems face mounting pressure to reduce costs while maintaining quality outcomes. SDD addresses this challenge effectively, demonstrating low post-discharge complication rates alongside enhanced patient satisfaction and optimized resource allocation.[4,34,51,105,108] The model generates economic benefits by direct healthcare savings. Despite emerging evidence from health technology assessments, European implementation remains inconsistent due to divergent national reimbursement frameworks, therefore positioning SDD adoption as both a clinical and policy imperative. Within these systemic constraints, individual discharge decisions must remain at the physician's discretion to ensure patient-centred care, regardless of the economic constraints.

Patient aspects and ethical considerations

The importance of shared-decision-making

When planning and implementing SDD protocols, it is important to take patients' needs, perspectives, and preferences into account. Key patient-related factors in existing SDD selection criteria include appropriate pre-procedural education, social support, the availability of an informal caregiver (in cases with sedation or general anaesthesia), and proximity and access to the hospital or another emergency facility.[17,25,73,88] The importance of these aspects is underlined by a multinational EHRA survey among EP professionals, in which more than half of respondents identified social environment and patient preference as relevant to SDD decision-making.[103]

Despite this, most published SDD protocols do not list patient willingness as a mandatory criterion, although reluctance has been shown to be a major barrier to successful implementation.[14] For example, patients' preference accounted for 30–70% of ONS among those eligible for SDD following AF ablation. Besides individual preferences, cultural expectations regarding ONS may exist.

Patient's perception of SDD—evidence

Evidence regarding patients' perceptions of SDD in EP and CIED procedures remains limited. In a German single-centre study, half of the patients hospitalized for AF ablation expressed willingness to participate in an SDD program.[103] Those with more pronounced symptoms tended to view SDD less favourably, and nearly half expressed concerns about recognition and management of complications after discharge. In contrast, studies from Greece and France assessing patient experience after participation in SDD programs reported high satisfaction levels. In the Greek study, 84% of SDD-eligible patients preferred SDD as the superior discharge strategy following elective CIED procedures.[28] Similarly, in a French cohort including 501 patients undergoing various EP interventions, 88% rated their SDD experience as good or very good, and 95% stated they would choose SDD again for a future procedure.[109] Nonetheless, about 10% of patients still reported uncertainty regarding medical instructions at discharge, highlighting the continued need for comprehensive patient education. These findings are consistent with observations in other cardiovascular interventions, such as elective PCIs, where patient satisfaction with SDD is generally high, though some individuals express anxiety or the perception that their condition was not taken seriously.[110–114]

Ethical considerations as a central part of SDD

Taking these considerations into account, this consensus document promotes a shared decision-making approach when planning SDD.[115] This should include a transparent discussion of the available evidence on the safety of SDD for each procedure type and appropriate education on post-procedural self-care and warning signs. Patients' concerns should be acknowledged and addressed using data on complication and readmission rates.

From an ethical standpoint, SDD should only be implemented when early discharge is demonstrably safe based on individual clinical evaluation and existing evidence, and when supported by suitable social and healthcare structures. Since there are groups of people who may be inherently disadvantaged with regard to fulfilling some SDD selection criteria, ensuring optimal inpatient treatment for these groups is of particular relevance. Non-randomized data suggest that SDD is feasible in multiple clinical contexts with low complication and readmission rates. Therefore, there are no ethical objections to its broader adoption in clinical practice.

When clinically appropriate, SDD is ethically justified, as it reflects responsible stewardship of limited healthcare resources through the reduction of unnecessary healthcare expenditure, the promotion of equitable resource allocation, and the enhancement of patient comfort.

Gaps in knowledge and future directions

Limited evidence and heterogeneous definitions

Most published evidence for SDD is retrospective, observational, or from single centres. There is a paucity of prospective multicentre RCTs comparing ONS with SDD across diverse patient populations and procedural types.[53] SDD strategies, patient selection, and post-discharge monitoring vary across studies and centres, which limit cross-study comparability. Meta-analyses underscore that synthesis of current data is challenged by heterogeneity in design and patient selection.[4,101] There is a need for multicentre RCTs in SDD both after EP and CIED procedures. In addition, there is a need for structured outcome reporting within an intention-to-SDD framework. Furthermore, reporting the proportion of patients initially planned for SDD who ultimately required ONS is particularly important. Such data are critical for real-world logistical planning, including bed availability, staffing, and workflow organization. Intended vs. achieved SDD rates could be proposed as quality indicators.

Personalized risk stratification

A major gap is the lack of validated and widely accepted risk stratification to identify safe candidates for SDD. Current practice is often based on expert opinion or institutional experience. Subpopulations, including elderly, frail patients, those with limited social support, or complex comorbidities, are underrepresented in the literature.[116] In addition, different post-procedural observation periods tailored to the individual peri-procedural risk should be explored.

Late and infrequent complications

While major complications are rare beyond the immediate post-procedural period, some observational studies still suggest a small number of events occur after six hours.[89] Late-onset complications such as pericardial effusion due to immunological reactions, delayed coronary spasms after PFA, lead complications, or delayed bleeding or infection may present after discharge in both SDD and ONS patients. Comprehensive data on 7-day or 30-day outcomes (readmissions, urgent care visits, all-cause mortality) are still limited.

Post-discharge monitoring strategies

The optimal model for post-discharge surveillance is incompletely defined. Whether structured in person or telephone follow-up, remote monitoring or digital follow-up is best remains uncertain. In addition, basic patient-centred strategies are inconsistently implemented. Standardized protocols with respect to obtaining informed consent specific to SDD, ensuring the presence of social support at home, providing clear written instructions and educating both patient and caregiver on when and how to seek medical attention are still lacking.

Health economics, patient experience, and equity

While some single-centre studies report cost savings, generalizable cost-effectiveness and cost-utility analyses are lacking, also due to the general heterogeneity of current SDD practices. PROMs and PREMs (satisfaction surveys) are infrequently reported, and none of the published SDD studies report quality-adjusted life year (QALY) gains or incremental cost-effectiveness ratios (ICERs).[117] Instead, they rely on cost-minimization and short-term hospital resource metrics. Equity concerns, including whether SDD may disadvantage rural or socioeconomically vulnerable patients, have received little attention. Furthermore, in some cases, discharge strategies may be driven or limited by national or centre-specific reimbursement policies that may not always align with the optimal strategy from the medical professional perspective.[8] Future research should incorporate standardized economic evaluations aligned with CHEERS 2022 criteria[118] incorporate PROMs and explore budget impact across diverse European healthcare systems to fully ascertain the financial ramifications of SDD implementation, especially given escalating healthcare expenditures and the imperative for resource optimization.

Standardization and collaborative registries

To facilitate meta-analyses and generalizability, a core set of outcome definitions (e.g. time to readmission, complication windows, quality-of-life endpoints) should be adopted across centres. Consortia or registries with harmonized endpoints and a collaborative electronic database would help pool evidence globally and reduce bias from small series.

Future directions: trials, digital tools, and dynamic risk models

While prospective, multicentre randomized trials comparing SDD vs. ONS, with stratification by procedural complexity, patient features, and local logistics, would be desirable, it is important to acknowledge that SDD has already been the standard in many institutions for most EP procedures for over ten years. It is however unclear whether it is safe to perform SDD procedures in ASC with no overnight beds, as is currently being done. Development of predictive risk models integrating procedural data, patient comorbidities, and social factors is needed. Digital tools (wearables, remote device monitoring, AI-based alerting) can enhance post-discharge safety.[119–122]

Education, training, and development

For SDD to function optimally, rather strict pathways and standards should be followed. This may interfere with training opportunities for cardiologists and EP fellows. A trade-off ensuring fewer patients per catheter lab allowing for longer procedure times combined with close supervision can overcome some obstacles. Furthermore, shorter in-hospital stays can complicate inclusion into clinical trials.

By addressing these gaps, the EP community can move towards evidence-based implementation of safe SDD across broader settings.

Conclusion

SDD after EP and CIED procedures appears to be a safe, efficient, and patient-centred care model when applied within structured, evidence-based clinical pathways. Contemporary data suggest comparable outcomes to ONS with respect to complications, readmissions, and early adverse events in selected patients. Beyond clinical safety, SDD offers important advantages in healthcare resource utilization, hospital capacity management, and cost efficiency. This clinical consensus statement of EHRA/ACNAP of the ESC provides a practical framework across the complete SDD pathway, from patient selection and peri-procedural

Table of Advice 1 Overview of procedures suitable for SDD and procedures favouring ONS

Advice on procedure selection for SDD	Strength
May be appropriate TO DO	
CIED procedures	
CIED battery exchanges as SDD	
Transvenous pacemaker implantation in patients without complete heart block as SDD procedure as procedural complication, readmission, and mortality rates are comparable with ONS	
Primary prevention ICD implantation in patients with stable heart failure as SDD procedure as procedural complication, readmission and mortality rates are comparable	
Subcutaneous ICD implantation and box change as SDD procedure	
CRT implantation in patients with stable heart failure as SDD procedure as procedural complication, readmission and mortality rates are comparable. Data on conduction system pacing remain limited, even if the same principle and complication rate should apply as for CRT	
Leadless pacemaker implantation as SDD procedure. Procedural complication rates are comparable. A jugular vein access may facilitate SDD in leadless pacemaker patients	
EP procedures	
SVT ablation (including those with transseptal access) as SDD procedure. It carries a lower risk than AF and VT ablations. Readmission rate, unplanned ER visits, and mortality are comparable	
Right-sided and/or left-sided PVC ablation in patients without structural heart disease as SDD procedure as it resembles SVT ablation in complexity and safety (right-sided)	
Straightforward *AF ablation*, especially single-shot AF ablations (Cryoballoon ablation or Pulsed Field Ablation) or simple RF ablations, as SDD procedures, when standardized patient screening and institutional protocols are in place	

Continued

Table of Advice 1 ***Continued***

Advice on procedure selection for SDD	Strength
Area of uncertainty	
Catheter ablation of VT in patients with structural heart disease and/or heart failure with reduced ejection fraction carries a higher periprocedural risk than SVT or AF ablation. It is uncertain, if SDD is a safe and feasible option in patients undergoing planned VT ablation. Patients presenting with VT storm are not part of the scope of this document and usually present as emergency	?
Patients with complete heart block were excluded from RCTs and observational trials on SDD CIED implantations. Thus, it is uncertain, whether SDD is non-inferior to ONS in these patients and if it is safe in this patient cohort	?
Patients with *secondary preventive ICD* were excluded from RCT and observational trials on SDD CIED implantations. These patients are primarily admitted via the emergency department. Thus, they differ from elective SDD patient cohorts	?
It is uncertain whether *transvenous lead extraction* for non-infectious indications is a safe and feasible option in carefully selected patients. Transvenous lead extractions remain high-risk interventions in often multimorbid patients which often require extended in-hospital treatment and stay	?

AF, atrial fibrillation; CIED, cardiac implantable electronic device; ICD, implantable cardioverter defibrillator; ONS, overnight stay; PVC, premature ventricular contraction; RCT, randomized controlled trial; SDD, same-day discharge; VT, ventricular tachycardia.

Table of Advice 2 Institutional advice for SDD Implementation

Institutional implementation of SDD	Strength
Advice to do	
Staffing models • Designate an SDD coordinator, ideally an experienced EP nurse, who should take care of SDD patient management, when available. Ensure cross-trained personnel for sedation, vascular access assessment, and discharge evaluation	
Scheduling • Prioritize SDD cases in early procedural slots • Complete pre-procedure assessments before the day of intervention.	
Infrastructure • Establish a dedicated day-case unit for preparation and observation • Implement streamlined transport pathways	
Procedural logistics Standardize vascular access techniques, haemostasis procedures, and equipment preparation to support early ambulation	
Documentation • Implement SOPs and checklists covering the entire SDD pathway • Provide structured discharge instructions	
Audit and quality Track SDD completion rate, conversion to overnight stay, procedure-to-ambulation time, readmissions, and patient satisfaction	
Patient engagement Provide comprehensive education and ensure availability of a post-discharge contact pathway	

SDD, same-day discharge; SOP, standard operating procedure.

Table of Advice 3 Pre- and post-procedural advice for SDD

Pre- and post-procedural advice for SDD	Strength
Advice to do	
Patient selection	
The decision to proceed with same-day discharge should be shared between the patient, the treating physician, and allied health professionals, taking into account relevant comorbidities (e.g. heart failure, pulmonary disease), potential procedural or clinical risk factors (e.g. elevated bleeding risk), and social considerations such as proximity to the hospital and availability of adequate support at home	
Post-procedural considerations	
After a SDD EP or CIED procedure in sedation or GA a responsible accompanying adult should be available for the first 24 h. That caregiver does not have to live in the same household but should be available at any time for the patient	
Post-procedural observation	
The in-hospital post-procedural observation period should be sufficient to rule out acute complications requiring medical interventions	
Follow-up	
Should be individualized based on the patient characteristics and procedural complexity	
Follow-up	
May be conducted by centres performing SDD programmes or by referring/primary care centres/physicians, or nurses, depending on local clinical practice, logistical capabilities, and local regulations	
Patient involvement and education	
Involvement of patients and caregivers[a] is essential. Clear information and instructions on how to recognize and react to the most common or serious complications should be provided, including contact numbers of local emergency services, cardiology outpatient clinics, or pacemaker clinics	
Patient involvement and education	
All SDD patients should be provided with a 24/7 contact information and clear self-monitoring instructions	

CIED, cardiac implantable electronic device; EP, electrophysiology; GA, general anaesthesia; SDD, same-day discharge.
[a]Includes the patients' family and/or caregivers.

management to post-discharge surveillance and organizational implementation, to support harmonized and reproducible practice. Broader adoption of SDD should be embedded within healthcare system-regulated and institutional governance frameworks, supported by digital follow-up strategies and continuous outcome assessment, to ensure sustained patient safety, quality of care, and healthcare system resilience.

Supplementary material

Supplementary material is available at *Europace* online.

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Data availability

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