



Norsk Resuscitasjonsråd
Retningslinjer 2010

OM NORSKE RETNINGSLINJER FOR HJERTE-LUNGEREDNING - 2010

Den nye internasjonale Guidelines for Cardiopulmonary Resuscitation ble publisert samtidig 18. oktober 2010 i tidsskriftene "Resuscitation" (Europa) og "Circulation" (USA).

International Liaison Committee on Resuscitation (ILCOR) består av ledende representanter for de ulike regionale resuscitasjonsråd i verden, herunder også American Heart Association (AHA) og European Resuscitation Council (ERC). ILCOR har utarbeidet det vitenskapelige grunnlaget for de nye guidelines i dokumentet "2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations" (1). På dette grunnlaget har så bl.a. ERC utarbeidet sine "2010 Guidelines for Cardiopulmonary Resuscitation" (2).

Norsk Resuscitasjonsråd (NRR) har på samme måte og i samråd med ledende akuttmedisinske miljøer på universitetssykehusene gått gjennom anbefalingene og legger her fram de reviderte norske retningslinjene for både basal og avansert hjerte-lungeredning både for barn og for voksne.

Der er fortsatt noen forskjeller mellom de norske retningslinjene og ERCs Guidelines, spesielt i AHLR. Ulikhetene framgår av de enkelte kapitlene i de norske retningslinjene, og utdypes ytterligere i vedlegget "Hvorfor er AHLR-algoritmen i Norge annerledes".

NRR og Norsk Førstehjelpsråd anbefaler at de nye norske retningslinjene implementeres fra 1. januar 2011 og framover, selv om det vil ta noe mer tid å revidere alle aktuelle læreprogrammer og algoritmeplakater. Det planlegges ikke noen sentral opplæringsprosess fra NRR sin side fordi endringene fra de gjeldende retningslinjer ikke er så store. Fagansvarlig personell i helsevesenet og personell med ansvar for opplæring, kursorganisasjoner o.l. bør kunne tilegne seg endringene ved å gå nøye gjennom stoffet som nå foreligger fra NRR, og kan så implementere de nye retningslinjene i egne organisasjoner og tjenester etter hvert som utøvende personell oppdateres faglig.

Mange av anbefalingene fra 2005 gjelder fortsatt, enten fordi det ikke foreligger ny forskning eller fordi ny forskning har styrket tidligere funn og konklusjoner. Endringene er derfor langt mindre omfattende enn ved guidelinesrevisjonen i 2005/2006. Lenker til fullstendige versjoner av både ILCORS grunnlags-dokument (1) og ERCs Guidelines (2) finnes på hjemmesidene til NRR (www.nrr.orrq).

NRR forholder seg til ERC-guidelines (2) med noen presiseringer og avvik:

- ◆ Section 1: Executive summary: Se hvert enkelt avsnitt i de norske retningslinjene.
- ◆ Section 2: Adult Basic life support and use of AEDs: Se "BHLLR retningslinjer 2010" og "DHLLR-retningslinjer 2010"
- ◆ Section 3: Electrical therapies: AEDs, defibrillation etc.: Se "DHLLR-retningslinjer 2010"
- ◆ Section 4: Adult advanced life support: Se "AHLR retningslinjer 2010"
- ◆ Section 5: Initial management of acute coronary syndroms: Dette faller utenfor Norsk Resuscitasjonsråds mandat. I spørsmål om behandling av akutte koronarsyndromer henviser NRR derfor til Norsk Cardiologisk Selskap. Dette gjelder også spørsmålet om pasienter med akutt koronarsykdom bør få ekstra oksygentilførsel eller ikke.
- ◆ Section 6: Pediatric life support: Se "Barn retningslinjer 2010".
- ◆ Section 7: Resuscitation of babies at birth: Se "Nyfødt retningslinjer 2010"
- ◆ Section 8: Cardiac arrest in special circumstances: Electrolyte abnormalities, poisoning, drowning, accidental hypothermia, hyperthermia, asthma, anaphylaxis, cardiac surgery, trauma, pregnancy, electrocution. (Ingen kommentarer fra NRR)
- ◆ Section 9. Principles of education in resuscitation (Ingen kommentarer fra NRR)
- ◆ Section 10: The ethics of resuscitation and end-of-life decisions (Ingen kommentarer fra NRR).

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Kristian Lexow, overlege

Leder, Norsk Resuscitasjonsråd

Viktige endringer i de norske retningslinjene for hjerte-lungeredning - 2010

Endringene i Guidelines 2010 fra ERC er ikke så omfattende som i 2005. Retningslinjene er fortsatt basert på tilgjengelig vitenskapelig dokumentasjon og en fornuftig, klinisk relevant tolkning av disse. De er utformet for å gi et godt grunnlag for så vel opplæring som utførelse. Nedenfor finner du en foreløpig oppsummering av de viktigste endringene. Endelig utforming av de norske retningslinjene vil drøftes i NRR og etter planen ferdigstilles etter rådsmøte 17.november.

- ◆ **Brystkompresjoner**
HLR utføres dessverre fortsatt altfor ofte med utilfredsstillende kvalitet og med lange perioder uten brystkompresjoner. Viktigheten av kompresjoner med god kvalitet og med minst mulig avbrudd understrekes derfor ennå sterkere i "Guidelines 2010".
 - På ikke-intubert pasient: 30 brystkompresjoner fulgt av 2 ventilasjoner (som før).
 - Etter evt. intubasjon: Kontinuerlig brystkompresjoner og 10 vent./min. (som før)
 - AHLR: Start kompresjoner umiddelbart etter sjokk og fortsett i ett min. før du vurderer om sjokket har lyktes (som før).
 - DHLR: Følg hjertestarterens råd (som før).
 - Trykk brystkassen ned 5-6 cm (mot før 4-5 cm) ved hver kompresjon (nytt).
- ◆ Gi god HLR mens defibrillatoren hentes, klargjøres og koples til pas.
Studier om effekten av noen minutter med god HLR før sjokk (hvis stansen har stått ubehandlet eller hvis det er gitt kvalitetsmessig dårlig HLR) er ikke konklusive. NRR anbefaler likevel at tjenester og sykehus som allerede praktiserer dette ikke endrer praksis. Dette er mest aktuelt ved
 - prehospital hjertestans (hvis stansen ikke er observert av helsepersonell med defibrillator)
 - ikke-bevitnet hjertestans på sykehus
- ◆ Gi tre-minutters-sløyfer HLR både ved sjokkbar og ikke-sjokkbar rytme (som før).
- ◆ Gi ett sjokk i hver sløyfe ved sjokkbar rytme - umiddelbart fulgt av HLR, dvs. ikke puls- eller monitorsjekk direkte etter sjokk (som før).
- ◆ Vurder egensirkulasjon (ROSC) ett minutt etter sjokk. Ved fortsatt sirkulasjonsstans: Gi evt. medikamenter og deretter HLR i ytterligere to min. før ny rytmeanalyse (som før).
- ◆ Gi tre sjokk direkte etter hverandre (tidligere anbefaling: To sjokk direkte etter hverandre) ved bevitnet ventrikkelflimmer forutsatt at sjokket kan gis umiddelbart, f.eks. på PCI-lab, på hjerteovervåkningsavdeling eller i ambulanse eller postoperativt etter hjertekirurgi (nytt).
- ◆ Atropin utgår som anbefalt medikament i AHLR selv om den første avleste hjerterytmene er asystole eller PEA (nytt).
- ◆ Større vektlegging av kapnografi som metode for å
 - bekrefte og overvåke korrekt plassering av endotrakeal tube, larynxtube o.l. (nytt)
 - monitorere kvaliteten av HLR gjennom måling av endetidal CO₂ (nytt)
 - få en tidlig indikasjon på gjenoppretting av spontan sirkulasjon (ROSC) (nytt)
- ◆ Unngå hyperventilering både under pågående resusciteringsforsøk og etter gjenoppretting av egensirkulasjon (ROSC) (som før).
- ◆ Unngå hyperoksi (unødig høy oksygenkonsentrasjon i blodet) etter gjenoppretting av egensirkulasjon (ROSC). Anbefalt SaO₂: 94-98% (som før).
- ◆ Medikamenter endotrakealt anbefales ikke som alternativ backupmetode (nytt).
- ◆ Standardisert post-resusciteringsbehandling etter ROSC
 - Terapeutisk hypotermi til komatøse pas. etter VF (som før)
 - Terapeutisk hypotermi til komatøse pas. også etter ikke-sjokkbare rytmer (nytt)
 - Rask behandling av grunnsykdommen (PCI eller alternativt trombolyse hvis STEMI) (som før)
 - Rask normalisering av sirkulasjonen (som før)
 - Blodsukkerverdiene bør ikke overskride 10 mmol/l (anbefalt maks. verdi: ny)
 - God krampebehandling (som før)

The International Consensus on Cardiopulmonary Science (3)

- ◆ The International Liaison Committee on Resuscitation (ILCOR) includes representatives from the American Heart Association (AHA), the European Resuscitation Council (ERC), the Heart and Stroke Foundation of Canada (HSFC), the Australian and New Zealand Committee on Resuscitation (ANZCOR), Resuscitation Council of Southern Africa (RCSA), the Inter-American Heart Foundation (IAHF), and the Resuscitation Council of Asia (RCA). Since 2000, researchers from the ILCOR member councils have evaluated resuscitation science in 5-yearly cycles. The conclusions and recommendations of the 2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care with Treatment Recommendations were published at the end of 2005. The most recent International Consensus Conference was held in Dallas in February 2010 and the published conclusions and recommendations from this process form the basis of these 2010 ERC Guidelines.
- ◆ Each of the six ILCOR task forces [basic life support (BLS); advanced life support (ALS); acute coronary syndromes (ACS); paediatric life support (PLS); neonatal life support (NLS); and education, implementation and teams (EIT)] identified topics requiring evidence evaluation and invited international experts to review them. The literature reviews followed a standardized “worksheet” template including a specifically-designed grading system to define the level of evidence of each study.
- ◆ When possible, two expert reviewers were invited to undertake independent evaluations for each topic. The 2010 International Consensus Conference involved 313 experts from 30 countries. During the three years leading up to this conference, 356 worksheet authors reviewed thousands of relevant, peer-reviewed publications to address 277 specific resuscitation questions, each in standard PICO (Population, Intervention, Comparison Outcome) format. Each science statement summarized the experts’ interpretation of all relevant data on a specific topic and consensus draft treatment recommendations were added by the relevant ILCOR task force. Final wording of science statements and treatment recommendations was completed after further review by ILCOR member organizations and the editorial board.
- ◆ The comprehensive conflict of interest (COI) policy that was created for the 2005 International Consensus Conference⁴¹ was revised for 2010. Representatives of manufacturers and industry did not participate in either of the 2005 and the 2010 conferences.

From science to guidelines (3)

- ◆ As in 2005, the resuscitation organisations forming ILCOR will publish individual resuscitation guidelines that are consistent with the science in the consensus document, but will also consider geographic, economic and system differences in practice, and the availability of medical devices and drugs. These 2010 ERC Resuscitation Guidelines are derived from the 2010 CoSTR document but represent consensus among members of the ERC Executive Committee. The ERC Executive Committee considers these new recommendations to be the most effective and easily learned interventions that can be supported by current knowledge, research and experience. Inevitably, even within Europe, differences in the availability of drugs, equipment, and personnel will necessitate local, regional and national adaptation of these guidelines. Many of the recommendations made in the ERC Guidelines 2005 remain unchanged in 2010, either because no new studies have been published or because new evidence since 2005 has merely strengthened the evidence that was already available.
- ◆ All authors of these 2010 ERC Resuscitation Guidelines have signed COI declarations.

The Chain of Survival (3)

- ◆ The actions linking the victim of sudden cardiac arrest with survival are called the Chain of Survival. The first link of this chain indicates the importance of recognising those at risk of cardiac arrest and calling for help in the hope that early treatment can prevent arrest. The central links depict the integration of CPR and defibrillation as the fundamental components of early resuscitation in an attempt to restore life. Immediate CPR can double or triple survival from VF OHCA.
- ◆ Performing chest-compression-only CPR is better than giving no CPR at all. Following VF OHCA, cardiopulmonary resuscitation plus defibrillation within 3–5 minutes of collapse can produce survival rates as high as 49%–75%. Each minute of delay before defibrillation reduces the probability of survival to discharge by 10%–12%. The final link in the Chain of Survival, effective post resuscitation care, is targeted at preserving function, particularly of the brain and heart. In hospital, the importance of early recognition of the critically ill patient and activation of a medical emergency or rapid response team, with treatment aimed at preventing cardiac arrest, is now well accepted.⁶ Over the last few years, the importance of the post-cardiac arrest phase of treatment, depicted in the fourth ring of the Chain of Survival, has been increasingly recognised.³ Differences in post-cardiac arrest treatment may account for some of the inter-hospital variability in outcome after cardiac arrest.



Epidemiology and outcome of cardiac arrest (3)

- ◆ Ischaemic heart disease is the leading cause of death in the world. In Europe, cardiovascular disease accounts for around 40% of all deaths under the age of 75 years. Sudden cardiac arrest is responsible for more than 60% of adult deaths from coronary heart disease. Summary data from 37 communities in Europe indicate that the annual incidence of emergency medical system (EMS)-treated out-of-hospital cardiopulmonary arrests (OHCA) for all rhythms is 38 per 100,000 population.
- ◆ Based on these data, the annual incidence of EMS-treated ventricular fibrillation (VF) arrest is 17 per 100,000 and survival to hospital discharge is 10.7% for all-rhythm and 21.2% for VF cardiac arrest. Recent data from 10 North American sites are remarkably consistent with these figures: median rate of survival to hospital discharge was 8.4% after EMS-treated cardiac arrest from any rhythm and 22.0% after VF. There is some evidence that long-term survival rates after cardiac arrest are increasing. On initial heart rhythm analysis, about 25-30% of OHCA victims have VF, a percentage that has declined over the last 20 years. It is likely that many more victims have VF or rapid ventricular tachycardia (VT) at the time of collapse but, by the time the first electrocardiogram (ECG) is recorded by EMS personnel, the rhythm has deteriorated to asystole. When the rhythm is recorded soon after collapse, in particular by an on-site AED, the proportion of patients in VF can be as high as 59% to 65%.
- ◆ The reported incidence of in-hospital cardiac arrest is more variable, but is in the range of 1–5 per 1000 admissions. Recent data from the American Heart Association's National Registry of CPR indicate that survival to hospital discharge after in-hospital cardiac arrest is 17.6% (all rhythms). The initial rhythm is VF or pulseless VT in 25% of cases and, of these, 37% survive to leave hospital; after PEA or asystole, 11.5% survive to hospital discharge.

Initial management of acute coronary syndromes (4)

Kommentar fra NRR

Behandling av akutte koronarsyndromer faller utenfor mandatet til Norsk Resuscitasjonsråd. I spørsmål om behandling av akutte koronarsyndromer, henviser NRR derfor til Norsk Cardiologisk Selskap (www.hjerte.no). Dette gjelder også spørsmålet om pasienter med akutt koronarsykdom bør få ekstra oksygentilførsel eller ikke.

Changes in the management of acute coronary syndrome since the 2005 guidelines include:

- ◆ The term non-ST-elevation myocardial infarction-acute coronary syndrome (NSTEMI-ACS) has been introduced for both NSTEMI and unstable angina pectoris because the differential diagnosis is dependent on biomarkers that may be detectable only after several hours, whereas decisions on treatment are dependent on the clinical signs at presentation.
- ◆ History, clinical examinations, biomarkers, ECG criteria and risk scores are unreliable for the identification of patients who may be safely discharged early.
- ◆ The role of chest pain observation units (CPUs) is to identify, by using repeated clinical examinations, ECG and biomarker testing, those patients who require admission for invasive procedures. This may include provocative testing and, in selected patients, imaging procedures such as cardiac computed tomography, magnetic resonance imaging etc.
- ◆ Non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided.
- ◆ Nitrates should not be used for diagnostic purposes.
- ◆ Supplementary oxygen is to be given only to those patients with hypoxemia, breathlessness or pulmonary congestion. Hyperoxaemia may be harmful in uncomplicated infarction. Monitoring of the arterial oxygen saturation (SaO₂) with pulse oximetry will help to determine the need for supplemental oxygen. These patients do not need supplemental oxygen unless they are hypoxaemic. Limited data suggest that highflow oxygen may be harmful in patients with uncomplicated myocardial infarction. Aim to achieve an oxygen saturation of 94–98%, or 88–92% if the patient is at risk of hypercapnic respiratory failure.

Kommentar fra NRR

Ukritisk bruk av O₂ til koronarpasienter både prehospitalt i ambulansetjenesten og på sykehus er antakelig fortsatt ganske utbredt, også i Norge. Guidelines 2010 bør føre til en mye mer kritisk og målrettet bruk av oksygen, også til koronarpasienter. NRR henviser til Norsk Cardiologisk selskap (www.hjerte.no) for presiseringer og anbefalinger om bruk av oksygen ved akutte koronarsyndromer.

- ◆ Guidelines for treatment with acetyl salicylic acid (ASA) have been made more liberal: ASA may now be given by bystanders with or without EMS dispatcher assistance.
- ◆ Revised guidance for new anti-platelet and anti-thrombin treatment for patients with STEMI and non-STEMI-ACS based on therapeutic strategy.
- ◆ Gp IIb/IIIa inhibitors before angiography/percutaneous coronary intervention (PCI) are discouraged.
- ◆ The reperfusion strategy in ST-elevation myocardial infarction has been updated:
 - Primary PCI (PPCI) is the preferred reperfusion strategy provided it is performed in a timely manner by an experienced team.
 - A nearby hospital may be bypassed by emergency medical services (EMS) provided PPCI can be achieved without too much delay.
 - The acceptable delay between start of fibrinolysis and first balloon inflation varies widely between about 45 and 180 minutes depending on infarct localisation, age of the patient, and duration of symptoms.
 - “Rescue PCI” should be undertaken if fibrinolysis fails.
 - The strategy of routine PCI immediately after fibrinolysis (“facilitated PCI”) is discouraged.

- Patients with successful fibrinolysis but not in a PCI-capable hospital should be transferred for angiography and eventual PCI, performed optimally 6 – 24 hours after fibrinolysis (the "pharmacoinvasive" approach).
- Angiography and, if necessary, PCI may be reasonable in patients with return of spontaneous circulation (ROSC) after cardiac arrest and may be part of a standardised post-cardiac arrest protocol.
- To achieve these goals, the creation of networks including EMS, non PCI capable hospitals and PCI hospitals is useful.

Kommentar fra NRR

Infarktpasienter med ST-elevasjon på EKG bør alltid vurderes for prehospital trombolyse eller PCI. PCI utføres på største sykehus og foretrekkes hvis pasienten kan innlegges raskt nok. Derfor bør alle regioner ha rutiner som sikrer god kommunikasjon mellom ambulansetjenesten og nærmeste kardiologiske avdeling om hvor pasienter med ST-elevasjons-infarkt bør transporteres.

- ◆ Recommendations for the use of beta-blockers are more restricted: there is no evidence for routine intravenous beta-blockers except in specific circumstances such as for the treatment of tachyarrhythmias. Otherwise, beta-blockers should be started in low doses only after the patient is stabilised.
- ◆ Guidelines on the use of prophylactic anti-arrhythmics, angiotensin converting enzyme (ACE) inhibitors/angiotensin receptor blockers (ARBs) and statins are unchanged.

Principles of education in resuscitation (5)

The key issues identified by the Education, Implementation and Teams (EIT) task force of the International Liaison Committee on Resuscitation (ILCOR) during the Guidelines 2010 evidence evaluation process are:

- ◆ Educational interventions should be evaluated to ensure that they reliably achieve the learning objectives. The aim is to ensure that learners acquire and retain the skills and knowledge that will enable them to act correctly in actual cardiac arrests and improve patient outcomes.
- ◆ Short video/computer self-instruction courses, with minimal or no instructor coaching, combined with hands-on practice can be considered as an effective alternative to instructor-led basic life support (CPR and AED) courses.
- ◆ Ideally all citizens should be trained in standard CPR that includes compressions and ventilations. There are circumstances however where training in compression-only CPR is appropriate (e.g., opportunistic training with very limited time). Those trained in compression-only CPR should be encouraged to learn standard CPR.
- ◆ Basic and advanced life support knowledge and skills deteriorate in as little as three to six months. The use of frequent assessments will identify those individuals who require refresher training to help maintain their knowledge and skills.
- ◆ CPR prompt or feedback devices improve CPR skill acquisition and retention and should be considered during CPR training for laypeople and healthcare professionals.
- ◆ An increased emphasis on non-technical skills (NTS) such as leadership, teamwork, task management and structured communication will help improve the performance of CPR and patient care.
- ◆ Team briefings to plan for resuscitation attempts, and debriefings based on performance during simulated or actual resuscitation attempts should be used to help improve resuscitation team and individual performance.
- ◆ Research about the impact of resuscitation training on actual patient outcomes is limited. Although manikin studies are useful, researchers should be encouraged to study and report the impact of educational interventions on actual patient outcomes.

Referanser

1. 2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Circulation*. 2010;122 (suppl 2):S250 –S638.
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3. Nolan JP, Soar J, Zideman DA, Biarent D, Bossaert LL, Deakin C, Koster RW, Wyllie J, Böttiger B on behalf of the ERC Guidelines Writing Group. European Resuscitation Council Guidelines for Resuscitation 2010. Section 1. Executive summary. *Resuscitation* 2010;81:1219-76.
4. Arntz HR, Bossaert LL, Danchin N, Nikolaou NI. European Resuscitation Council Guidelines for Resuscitation 2010. Section 5. Initial management of acute coronary syndromes. *Resuscitation* 2010;81:1353-66.
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