



**Ikatan Dokter Indonesia (IDI) Wilayah Nusa Tenggara Barat (NTB)  
dan Perhimpunan Dokter Spesialis Saraf Indonesia (PERDOSSI) Cabang Mataram**

## ***Sertifikat***

diberikan kepada :

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*Sebagai*

**Pembicara**

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*Pada*

## **WORKSHOP STROKE : EMERGENCY SETTING**

**Mataram, 10 Desember 2017**

**Hotel Golden Palace**

**SK PB IDI No. : 0369/PKB/IDI-Wil. NTB/X/2017**

**Peserta: 9 SKP, Pembicara: 4 SKP, Moderator: 2 SKP, Panitia: 1 SKP**

Ketua IDI Wilayah NTB

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Mataram, 10 Desember 2017  
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# STROKE IN EMERGENCY ROOM

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Mataram, 10 Desember 2017

# Stroke Classification

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- Two broad classifications of stroke : ischemic and hemorrhagic.
- Acute ischemic stroke (AIS) is caused primarily by embolism, thrombus, or hypoperfusion.
- Hemorrhagic stroke : the parenchyma (intracerebral hemorrhage [ICH]) or the subarachnoid space (subarachnoid hemorrhage [SAH]).

# Acute ischemic stroke

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# Clinical Presentation

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- One-sided weakness with difficulty speaking.
- Symptoms and localization of neurologic findings, depend on the area of the brain which is affected.
- Symptoms may include:
  - cognitive impairment, weakness or numbness on one side of the face or body (hemiplegia), aphasia, loss of vision/visual changes, vertigo, ataxia, altered taste, droopy eyelids, aphagia, weakness or altered movement of the tongue, decreased reflexes, tachycardia, loss of consciousness, and headache.

# Patient Evaluation and Work-up

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- Several diagnoses which mimic the presentation of an AIS must be ruled out
  - Meningitis,
  - Hypertensive encephalopathy,
  - Brain tumor,
  - Seizure with a postictal state,
  - Complicated migraine,
  - Hypoglycemia,
  - Drug or alcohol overdose, or
  - Conversion disorder



# In Emergency Department

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- Time is of the essence given the narrow therapeutic window for treatment.
- Initial evaluation, a thorough neurological exam, diagnostic/ laboratory testing and neuroimaging should be obtained as quickly as possible.
- ED clinicians should adopt the mind set that an AIS is a “brain attack,” and should triage the patient with the same sense of urgency as an acute myocardial infarction or severe trauma regardless of presenting deficits.
- That early treatment is associated with the better patient outcomes
- The goal of treatment in an AIS is to preserve the penumbra tissue.<sup>6</sup>

# Treatment Options for Acute Ischemic Stroke

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- are limited.
- Intravenous (IV) alteplase (t-PA) is the only US FDA-approved drug therapy for the treatment of an AIS.



# Blood Pressure Control

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- remains controversial for all types of stroke.
- General consensus in AIS for those patients not receiving IV t-PA is to treat SBP >220 mm Hg or DBP >120 mm Hg, and to do so with a slower lowering approach
- Lisinopril and labetalol control hypertension well and may decrease the likelihood of neurological decline

# Blood Glucose Control

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- Hyperglycemia during the first 24 hours post AIS is associated with worse outcomes
- The exact mechanism is unclear, but is thought to be caused by inadequate perfusion that increases tissue acidosis through a combination of anaerobic glycolysis, lactic acidosis, and free radical production.
- Keep blood glucose in the range of 140 to 185 mg/dL to prevent hypo- and hyperglycemia

Bruno A, Biller J, Adams HP, Jr., et al. Neurology. 1999; 52(2):280-284.

Leigh R, Zaidat OO, Suri MF, et al. Stroke. 2004;35(8):1903-1907.

Lindsberg PJ, Roine RO. Stroke. 2004;35(2):363-364.

Parsons MW, Barber PA, Desmond PM, et al. Ann Neurol. 2002;52(1):20-28.

# Temperature

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- Fever has also been associated with worse neurologic outcomes
- Lowering temperature early may improve prognosis
- proposed mechanisms include increased metabolic demands, enhanced release of neurotransmitters, and increased free radical productions
- Ibuprofen, aspirin, and acetaminophen have all been used as antipyretics
- No increased bleeding risk has been reported with ibuprofen or aspirin

# Subarachnoid Hemorrhage

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# Clinical Presentation

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- Severe headache is the typical differentiating symptom
- may also present with elevated BP,
- a transient loss of consciousness,
- nausea and vomiting,
- a stiff neck,
- focal neurological deficits

# Patient Evaluation and Work-Up

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- First steps in management are to assess the ABCs: airway, breathing, and circulation.
- Diagnosis of SAH begins with clinical suspicion and a complete neurologic exam.
- A head CT without contrast can diagnose a SAH >95% of the time and is readily available at most centers.

# ED Management

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- Early management should focus on treating the cause of the SAH and primary prevention of secondary complications
- Monitoring of fluid balance should begin in the ED and adequate hydration should be initiated to avoid fluid contraction



# Rebleeding/Blood Pressure

- Lowering BP may have a protective effect for rebleeding and, as such, has become an accepted part of treatment.
- In patients who present with elevated BP, the initial instinct is to lower BP to recognized normal ranges.

**Table 4.** Antihypertensive Dosing for Subarachnoid Hemorrhage and Intracerebral Hemorrhage

	Labetalol	Nicardipine	Hydralazine
Dose	10-20 mg IV bolus over 1-2 min; repeat prn every 10-20 min (max 300 mg); start continuous infusion at 2-8 mg/min	5 mg/h infusion, titrate up by 2.5 mg/hr every 5 min to a max of 15 mg/h	10-40 mg IV bolus over 1-2 min; repeat prn every 10-20 min
MOA	$\alpha_1$ , $\beta_1$ , $\beta_2$ receptor antagonism	Peripheral calcium channel antagonism	Systemic arteriole vasodilation
Onset of Action	5 minutes	1 minute	5-15 minutes
Duration of Action	Single dose: 15-30 min, Multiple doses (1.75-3.25 mg/kg cum): 16-18 hours	3 hours	15-30 minutes
Cost	\$\$ <sup>a</sup>	\$\$\$ <sup>b</sup>	\$ <sup>c</sup>

<sup>a</sup> \$\$ = Higher cost

<sup>b</sup> \$\$\$ = Highest cost

<sup>c</sup> \$ = Lower cost

# Cerebral Vasospasm/Hydrocephalus

- Cerebral vasospasm typically has a delayed onset of 3 to 5 days after the initial event.
- Vasospasm is seen in 30% to 70% of patients and accounts for about 50% of deaths following SAH
- Prophylaxis against cerebral vasospasm with nimodipine and/or magnesium is typically initiated within 48 hours as a postsurgical intervention in the intensive care unit (ICU).
- Hydrocephalus and ventricular enlargement within 72 hours of SAH is common when intraventricular hemorrhage is also present.
- intraventricular drains for fluid diversion is recommended

# Seizure Prophylaxis

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- Seizures are a secondary complication of SAH
- Short-term drug therapy for seizure prophylaxis is recommended immediately following the posthemorrhage period
- Loading doses of phenytoin 15-20 mg/kg IV/PO or levetiracetam 500-2000 mg IV/PO should be advocated.
- Maintenance therapy for a short duration should be continued in the ICU.

# Blood Glucose

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- Common practice in a SAH patient population is to maintain blood glucose between 130 to 150 mg/dL, but achieving such tight control is difficult
- a blood glucose range of 100 to 180 mg/dL is a reasonable goal.

# Sedative Use

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- Use of sedatives, however, makes a complete neurological examination, diagnosis, prognosis, and evaluation of clinical improvement or deterioration difficult
- Their use should be minimized.
- If sedation is required, agents with a rapid onset and offset are preferred.
- Propofol meets these criteria and has the added benefit of lowering elevated ICP.

# Surgical Repair

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- most patients will require definitive surgical intervention with clipping or coiling if the aneurysm is anatomically accessible.
- Clipping is a more invasive procedure and involves a craniotomy and placement of a clip around the neck of the aneurysm.
- Coiling is a lessinvasive procedure. A femoral catheter is inserted and fed to the site of the aneurysm.

# Intracerebral Hemorrhage

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# Intracerebral Hemorrhage

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- ICH is a medical emergency.
- Rapid diagnosis and attentive management of patients with ICH is crucial, because early deterioration is common in the first few hours after ICH onset.
- The risk for early neurological deterioration and the high rate of poor long-term outcomes underscore the need for aggressive early management.

# Clinical Presentation

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- Vomiting
- SBP >220 mm Hg
- severe headache
- coma or decreased level of consciousness
- symptom progression over minutes or hours  
all suggest ICH
- although none of these findings are specific;  
neuroimaging is thus mandatory
- CT and magnetic resonance imaging (MRI)  
are both reasonable for initial evaluation

# ED Management

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- The crucial resources necessary to manage patients with ICH include neurology, neuroradiology, neurosurgery, and critical care facilities that include
- Consultants should be contacted as quickly as possible while the patient is in the ED, and the clinical evaluation should be performed efficiently, with physicians and nurses working in parallel. Equately trained nurses and physicians
- A routine part of the evaluation should include a standardized severity score
- After diagnosis, emergency providers should arrange for rapid admission to a stroke unit or neuroscience intensive care unit

# Blood Pressure

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- BP should be controlled in all ICH patients.
- Measures to control BP should begin immediately after ICH onset.
- For ICH patients presenting with SBP between 150 and 220 mm Hg and without contraindication to acute BP treatment, acute lowering of SBP to 140 mm Hg is safe and can be effective for improving functional outcome.

# Glucose Management

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- Glucose should be monitored.
- Both hyperglycemia and hypoglycemia should be avoided.
- A randomized trial showing improved outcomes with tight glucose control (range, 80–110 mg/dL) using insulin infusions in mainly surgical critical care patients.

van den Berghe G, Wouters P, Weekers F, Verwaest C, Bruyininckx F, Schetz M, Vlasselaers D, Ferdinande P, Lauwers P, Bouillon R. *N Engl J Med.* 2001;345:1359–1367  
Hemphill, J. C., Greenberg, S. M., Anderson, C. S., Becker, K., Bendok, B. R., Cushman, M., ... & Scott, P. A. *Stroke.* 2015;46(7), 2032-2060.

# Temperature Management

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- Fever worsens outcome in experimental models of brain injury.
- Fever is common after ICH, especially in patients with intraventricular hemorrhage.
- In patients surviving the first 72 hours after hospital admission, the duration of fever is related to outcome and appears to be an independent prognostic factor in these patients.
- Treatment of fever after ICH may be reasonable



# Seizures and Antiseizure Drugs

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- Clinical seizures should be treated with antiseizure
- Patients with a change in mental status who are found to have electrographic seizures on EEG should be treated with antiseizure
- Continuous EEG monitoring is probably indicated in ICH patients with depressed mental status that is out of proportion to the degree of brain injury
- Prophylactic antiseizure medication is not recommended



# Surgery

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- Timing of surgery for ICH remains controversial.
- A Randomized prospective trials to date have reported on a wide time frame or surgery that ranges from 4 to 96 hours after symptom onset.
- Subgroup analyses of patients in STICH II suggested a trend toward better outcome for patients operated on before 21 hours from ictus
- An individual patient metaanalysis of 2186 patients from 8 trials of surgery for ICH found that surgery improved outcome if performed within 8 hours of hemorrhage.<sup>247</sup>
- Ultra-early craniotomy (within 4 hours from ictus) was associated with an increased risk of rebleeding in a study that involved 24 patients.

# Summary

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- All strokes—AIS, SAH, and ICH—require emergent treatment and supportive care.
- For AIS patients in the ED, the focus is on quick attainment of symptom history, neurological imaging, and labs to facilitate rapid treatment and supportive care.
- In SAH and ICH, while treatment is surgical, management in the ED should focus on prevention of delayed complications and initiate supportive care to decrease morbidity

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TERIMA KASIH