Critic care for ishemic stroke

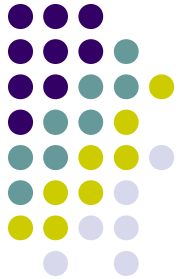
Dr Behcet Al
Emergency department of medicine school, Gaziantep University
Turkey

Stroke

- Stroke is the first cause of morbidity and long-term disability,
- Second cause of dementia
- First cause of epilepsy in adult
- One of the common cause of depression.

Rothwell PM et al. Lancet 2005;366:1773-1783.

Critical care begins prehospital



- Contact to health center quickly **(class II, level B)**
- Transport the stroke to the healt center that can perform specific treatment **(class III, level B)**
- Teach **“Face-Arm-Speech-Test”** to the ambulance staff **(class IV, GCE*)**
- Urgent clinical-laboratuary-imaging; definetly diognosis and right therapy **(class III, level B)**
- Direct the patients with transient ischemia stroke (TIS) to stroke center **(class III, level B)**

GCE*: Good clinical experience

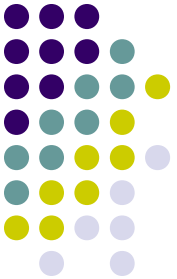
The basic purpose of prehospital critical care is blocking the delaying

Treatment delaying? Because the puplic

- Doesn’t notice the stroke signs sufficiently,
- İnform ED late,
- Are not aware of seriousness,
- Expect the symptoms will get weel spontaneously,
- Delay in emergency department,

Kwan J et al. Age Ageing 2004;33:116-121

Critical care begins with hindering the delay in ED.



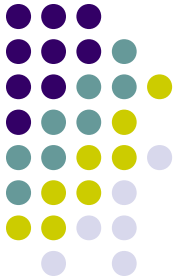
- Consider the stroke as an emergency disease,
- Eradicate the transportation sufficiency in hospital,
- Early medical evaluation,
- Provide early imaging,
- Start the thrombolitic therapy in CT room,
- Control the quality every time.

Kwan J et al. Age Ageing 2004;33:116-121.

Diagnosis methods diagnosis imaging

- CT/difüfusion MRI in patients with TIA/ IA **(class II, level A)**
- Do emergency vascular imaging for selected patients (TIA, patients with minor IA) (USG, CT angiography/MR angiography) **(class II, level A)**

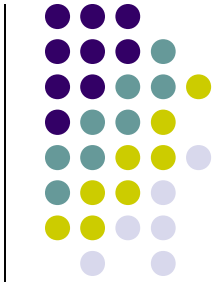
Other diagnosis procedures



- Blood tests, clinical evaluation **(calss I, level A)**

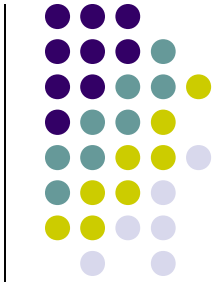
- ECG monitorization (**calss I, level A)**
- Holter ECG for suspected dysrthymia **(class I, level A)**
- ECO for selected patients **(class III, level B)**

General stroke treatment



- Do not dicrease BP rutinly **(class IV, İKD)**
- Reduce the BP (>220/120 mmHg) in patients with hypertensive encephalopaty, aort dissection, severe hearth failure under control **(class IV, GCE)**
- Use insulin if serum glukos level is >180 mg/dl **(class IV, GCE),**
- Give IV dextrose in case of hpoglisemia (<50 mg/dl) **(class IV, GCE),**
- If fever is >37.5°C administer acetaminophen **(class III, level C),**
- Do not administer emprical antibiotic if the patient is not immunsupressed **(class II, level B)**

General treatment



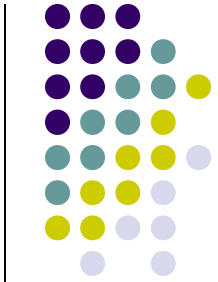
- We intend to stabiİize the problems that can deteriorate stroke

So, we uvaluate and treat:

- Cardiopulmonary care,
- Fluid-electrolit balance,
- BP,
- Seizure,
- Venous thromboembolism
- Dysfagia
- Aspiration pneumonia,
- Impression wounds,
- Elevated intracranial pressure.

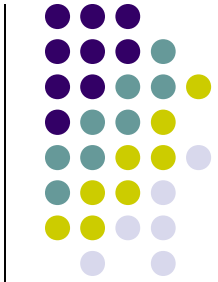
Leys D etal. Cerebrovasc Dis 2007;23:344-352.

At first control



- Neurological state,
- BP,
- Pulse,
- Oxygen saturation,
- Glucose,
- Fever,
- Fluid-electrolit balance,

Intense monitorization

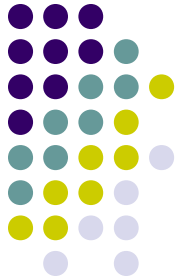


- Progression in neurological deficit,
- Conscious deterioration,
- Cardiopulmonary dissease history,
- 24 hours after thrombolysis,

In case of extensive stroke, seizure, pneumonia, HF, PE, COLD give **O_2**,

*Albers GW et al. Ann Neurol 2006;60:508-517

Cardiac Care

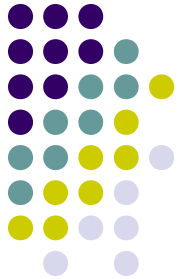


- ECG for all patients,
- Troponin may icreases,
- Cardiac monitorization to investigate dysrhythmias (AF),
- Try to provide normal cardiac outpute,
- Use inotrpic agents if fluid treatment is unsuccessful for hypovolemia,
- ECO for selected patients

Phang T et al. Adams HP et al. Stroke 2007;38(5):1655Y1711

Wira CR et al. West J Emerg Med 2011;12(4):414Y420

Fluid replacement

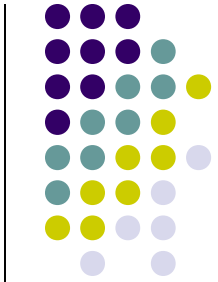


- Dehidratation shows bad prognosis at admission time*.
- Avoid from dextrous at early period**.
- Use serum physiological during firs 24 hours, **(class IV, GCE)**

*Bhalla A et al. , Stroke 2000;31:2043-2048.

**Gray CS et al. Lancet Neurol 2007;6:397-406.

Approach to BP

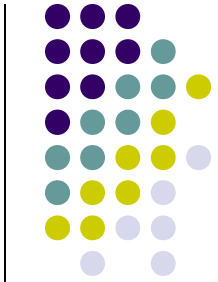


- Anormal BP is related to early neurological deterioration and bad prognosis in first 24 h.

- Low BP may be related to extensive infarct, CHF, MI, hypovolemia and sepsis at begining of stroke,

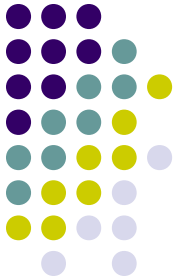
Castillo J et al. , Stroke 2004;35:520-526.

Approach to BP



- There is no evidence about the possitive effect of acute intervention to BP on prognosis.
- Pratically, many centers intervene when BP is > 220/120 mmHg.
- Reduce the BP in case of serious HF, ARF, malingn HT, aort dissection.
- Intervene to BP (SBP> 185 mmHg) if you perform thrombolitic treatment.
- Use IV labetolol or sodyum nitropurissid,

Approach to glucose



- Hyperglisemia is chanced upon in 60% of nondiabetics.
- Hyperglisemia is associated with extensive infract, cortical infarct, bad functional prognosis*.
- There is no evidence about actively reducing glucose straightenes out the prognosis or not.

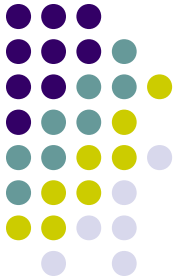
***Parsons MW et al. Ann Neurol 2002;52:20-28.**

Approach to glucose

- Do not use insulin infussion for moderate hyperglisemia
- Reduce hyperglisemia (>180 mg/dl,10 mmol/l)
- Administer IV %10-20 dextrous in case of hypoglisemia (<50 mg/dl.

Gray CS et al. Lancet Neurol 2007;6:397-406.

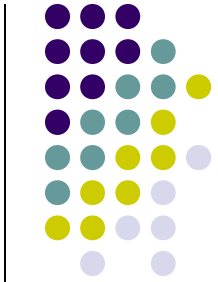
Intervention to hyperthermia



- Fever occurs in 25% to 50%of patients after AIS and is more common with more severe deficits, bad prognosis
- İnvestigate infection in presence of fever,
- Use acetaminophen, ibuprofen, or other NSAID for high fever (>37.5°C)

Hajat C et al., Stroke 2000;31:410-414.

Specific treatment



- Using 0.9 mg/kg (max 90 mg) IV rtPA within 3 hours (%10'u bolus, the remainder in 60 min infussion) causes evident improvement in clinical signs **(class I, level A),**
- Using IV rtPA after 3 hours also provided sitatisticaly significant benefit??? **(Sınıf I, level B),** but it is not advised rutinely.
- Reduce hypertention (>185/110 mmHg) just before thrombolitic treatment **(class IV, GCE).**
- Reccommend IV rtPA to patients with seizure whose neurological deficit is related to acute stroke. **(class IV, GCE)**

Specific treatment

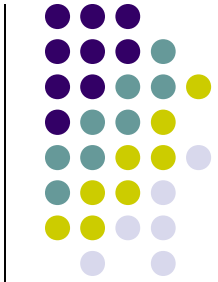
- IV rtPA can be applied to selected patients (>80 yeras old and e <18 years old) (class III, level C) But it is not certificated in Europe

- rtPA (via arterial) can be applied to patients with acute MCA obstruction within 6 hours (class II, level B).
- For recanalization and reperfusion Alteplase, tenecte plase and mechanical devices are widely used as alternative treatment options.

- Acetylsalicylic acid (160–325 mg) is recommended within 48 hours (class I, level A)

- If thrombolitic therapy is planned, do not give acetylsalicylic acid or other antithrombolits within 24 h (class IV, GCE)

Specific treatment



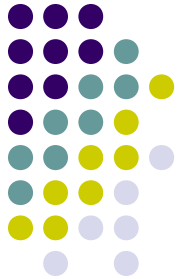
- Other antiplattelet agents are not recommeded for acute stroke phase (class III, level C)
- Glikoprotein IIb-IIIa inhibitores (class I, level A)
- UFH, LMHH (class I, level A)
- Neuroactive agents (class I, level A)

ARE NOT RECOMMEDED

- Hyperglisemia,
- DM history,
- Severity of symptoms at begining,
- Old age,
- Length of time until treatment,
- Previous Acetylsalicylic acid using,
- CHF history
- Violation of protocol

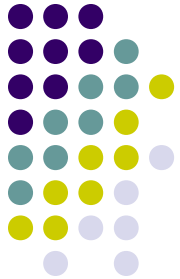
Are related to intracerebral bleeding complication post rtPA administration

Approach to vascular risk factors



- Measure BP and blood sugar orderly,
- The target for intervention to HT is 120/80 mmHg (class IV, GCE).
- Hyper/normotensive (120-139/80-90 mmHG) patients with CHF, MI, DM, CRF need medication (class I, level A),
- ACE/ARB are advised for medication (class I, level A)
- Reduce BP of patients with DM to <130/80 mmHg (class I, level A).

Approach to vascular risk factors



- Give statin in presence of high colesterol level (150 mg/dll) **(class I, level A)**
- Force patient to leave smoking and alchol drinking **(class III, level B)**
- Advise orderly physical activity **(class III, level B)**
- Advise poor saturated fat and salt; rich fiber diet **(class III, level B)**
- Advise patients to lose wight **(class III, level B)**

Kurth T et al. Arch Intern Med 2006;166:1403-1409. Mancia GJ Hypertens Suppl 2007;pp7-12.

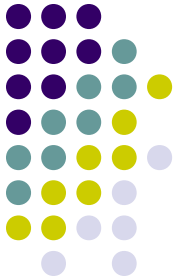
Early anticuagulation

- Low/moderate dose of SC UFH within 24-48 h is useless
- Heparine can be given to patients who are under high reembolization (cardiac origin embolie) risk.

*extensive infarct (example: >50% MCA infarct),
*uncontrolled HT,
*Widespread microvascular change in brain

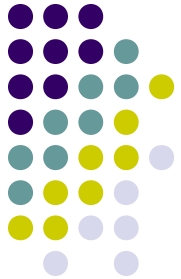
are contraindication for heparin treatment

Secondary protection
Approach to vascular risk factors



- Measure BP orderly,
- Reduce BP after acute phase passes **(class I, level A)**
- Think about way of life for diabetic patients, and intervene with farmacological treatment according to person unique **(class IV, İKD)**
- Give statin to patients with noncardioembolic stroke **(class I, Düzey A)**

- Encourage stop smoking **(class III, level C)**
- Encourage stop drinking **(class IV, GCE)**
- Advise orderly physical activity **(class IV, GCE)**
- Advise poor saturated fat and salt; rich fiber diet **(class IV, GCE)**
- Advise to escape from more weight **(class IV, level C)**
- Advise positive airway pressure respiratory support (BIPAP) to patients with OSA **(class III, level GCE)**
-

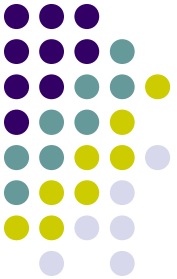


Antitrombotic therapy

- Antitrombotic is recommended **(class I, level A)**
- Antiplatelet therapy is advised to patients who don't need anticuagulation **(class I, level A).**
- Advise acetylsalycilic acid + dipiridamol combination or only clopidogrel **(class I, level A).**
- Without special endication such as AP, non-Q MI, Acetylsalycilic acid and clopidogrel combination should not be used during 9 months after stroke for patients had stroke in the near past again **(class I, level A)**

Bhatt DL et al. N Engl J Med 2006;354(16):1706Y1717

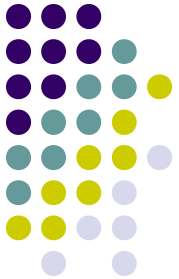
Brain edema and icreased intracranial pressure



- Surgical decompression is advised to patients <60 years old who had malign MCA infarct within 48 h **(class I, level A)**

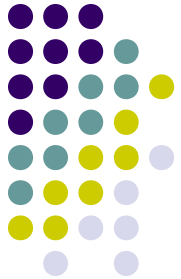
- Ventriculostomy and surgical decompression may be advised for widespread cerebellar infarcts **(class III, level C)**

Medical treatment



- Elevate the head position to 30°’degree,
- Avoid from harmful stimulus,
- Decraese the pain,,
- Appropriate oxigenization,
- Hold body warmth between normal level,
- Hold cerebral perfussion pressure >70 mmHg.
- Use IV 10% gliserol (4 x 250 ml) or mannitol (25-50 g 4x1) in presence of edeme,
- Avoid from hpotonic solution and corticosteroids

Hypotermia



- Moderate hypotermia (33-36°C) decreases mortality in patients with serious MCA infarct,
- Mortality appears to be lower and long-term outcomes better for those patients who are hypothermic on admission,
- Major risk to consider is that such hypothermia might suppress or mask a fever caused by infection.

The prevention and teratment of complications

- In presence of infection give antibiotic **(class IV, GCE)**
- Advise compression sock and early mobilization to protect aspiration pneumonia, PE, DVT and impressing wounds **(class IV, GCE),**
- Advise low dose of SC heparin/DMWH to patients who have high risk of DVT **(class I, level A)**
- To prevent repeat seizures advise anticonvulsant drugs **(class I, level A)**.
- Evaluate falling down risk for every patient **(class IV, GCE)**
- Advise calsium/D vitamin to every patient has falling down risk **(class II, level B)**

The prevention and teratment of complications

- Evaluate swallowing **(class III, GCE)**
- Follow malnutrition

- Advise oral diet preparats to patients with malnutrition without dysfagia and start NG feeding within 48 h **(class II, level B),**

- Think to perform percutan enteral gastrostomy (PEG) after 2 weeks **(class II, level B)**

Impression wound

- Change the position frequently,
- Optimize the feeding state,,
- Moisten sacral skin,
- Dry the skin for patients have incontinence,,
- Advise well-ventilated beds for patients have high risk.

Seizures

Standart antiepileptic therapy is recommended for suizures,
Proflactic anticonvulsant therapy is not advised.
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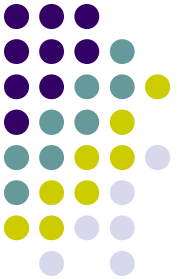
Curr Treat Options Neurol 2005;7(4):247Y259.

William M, et al. Neurol 2012;18(3):547–559

Rehabilitation



- Take the patients to stroke unit for rehabilitation **(class I, level A)**
- Start rehabilitation early **(class III, level C)**
- Transfer the patients to rehabilitation early who have mild or moderate clinical signs **(class I, level A)**
- Continoue to rehabilitation throughout one year **(class II, level A),**
- Control the patients for depression **(class IV, level B)**
- Treat the bed sensation-state **(class I, level A)**

- Give TCA/anticonvulsants for neurophatic pain **(class III, level B)**
- Advise botulinum toxin for spastisity **(class III, level B)**

Organize training programmes for puplic and health staff **(clas II, level B)**

*Kjellstrom T et asl. Cerebrovasc Dis 2007;23:231-241.

Preventing stroke

(Atria fibrillation, intracranial atherosclerosis, patent foramen ovale, and carotid artery occlusion)
Xa inhibitors, which do not require monitoring, have reached the market as alternatives to warfarin.
Xa inhibitor apixaban is superior to warfarin in preventing strokes (ischemic and hemorrhagic), causing less hemorrhage and reducing mortality.

Sandercock P et al. Lancet. 2012;379:2352–2363

Saver LJ et al. 2012;380:1241–1249