

# **HEAD INJURY EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION**

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# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

- No head injury is minor to be neglected or severe to be given up



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# HEAD INJURY



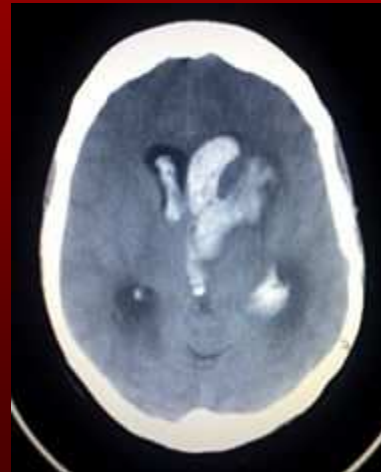
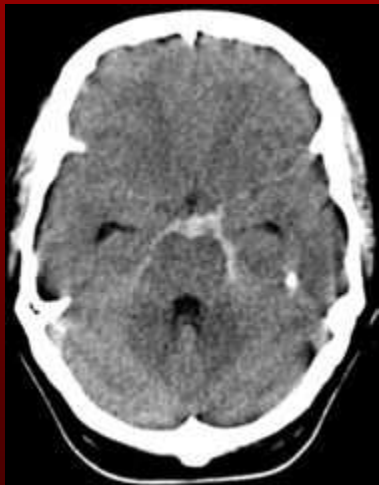
- Over 5.56 million accidents occur Worldwide per year
- 1.2 million death
- 3400 death/day
- In India more than 1 million accidents per year

# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

- In UK 62 million people
- 150000 people injury/year
- 15000 severe head injury
- 4000 die/year (Mendelow August 2002)



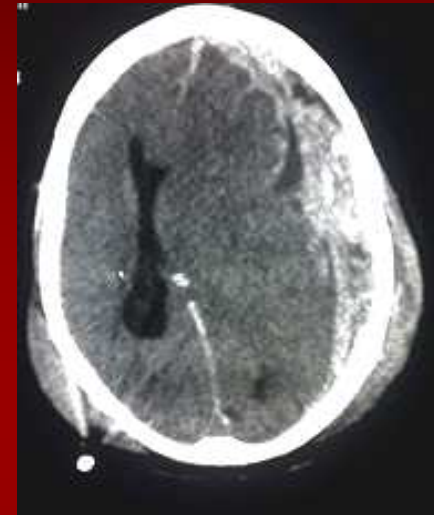
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# HEAD INJURY



## Head Injury in USA

- 1 Accident per minute
- 1 death every 5 minutes
- 50,000 deaths every year
- 80,000 – 90,000 loose their job
- 50-60% patients with minor head injury have problems
- 1 head injury maintaining one year cost 4 million US\$

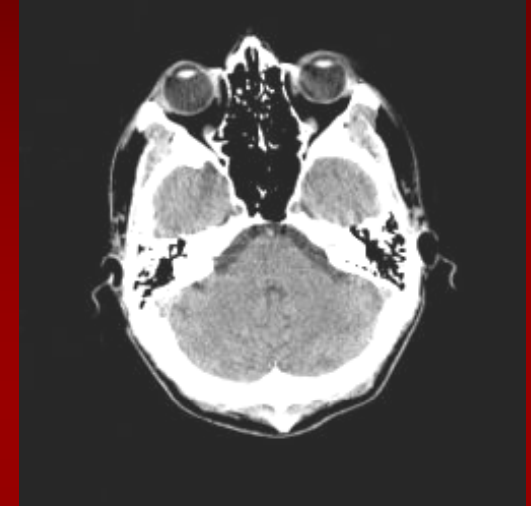


# HEAD INJURY



## Head Injury in Germany

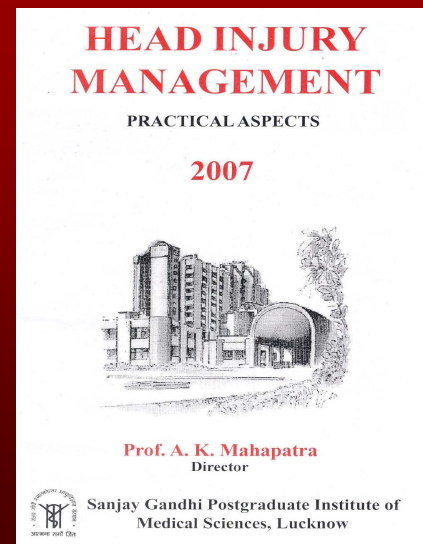
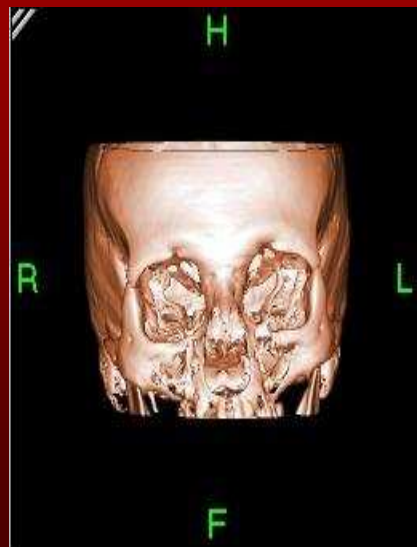
- 80 million
- 300-500/100000 Population
- 30,000 deaths/year
- Overall annual cost US\$ 38 Billion
- 12% of all hospital cost



# HEAD INJURY



- In Gulf over last few year 42% rise in incidence of head injury (Oman Times, 14<sup>th</sup> April 2000)



# HEAD INJURY



## IN OMAN

<u>Year</u>	<u>No. of accidents</u>	<u>No. of Deaths</u>
1970	50	3
1975	1874	183
1995	11025	479
1999	8947	604



# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

## Overall incidence per 100,000 population

- |     |          |         |
|-----|----------|---------|
| (a) | - Urban  | 400-500 |
|     | - Rural  | 300-400 |
| (b) | - Male   | 400-600 |
|     | - Female | 200-400 |



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# HEAD INJURY



## Incidence from different countries

Authors	Year	Country	Per 100,000
• Field et al	1976	UK	430
• Jennett & McMillan	1981	UK	270
• Kraus et al	1984	San Diego USA	180
• Edna & Cappelen	1986	Rhode Island	152

# HEAD INJURY



## Road accident from various countries (1991)

Countries	Accidents per 10,000 vehicle/year	Death per 10,000 vehicle/year
• Australia	3.1	0.39
• Brazil	1.3	0.34
• France	8.7	0.40
• Japan	9.8	0.20
• UK	14.0	0.52
• USA	12.2	0.25
• India	31.8	2.50

# HEAD INJURY



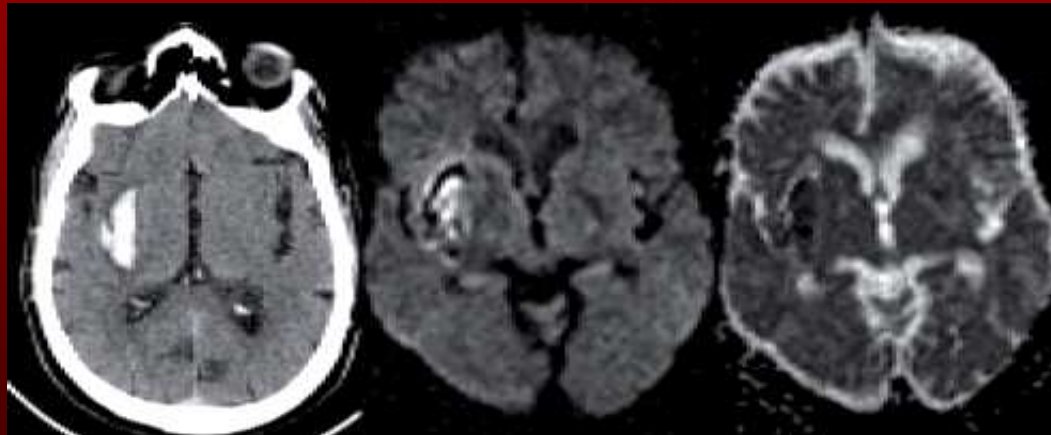
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## DEATHS

No. of Deaths /  
Million accidents

1945  
1985

300-400  
1000



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# HEAD INJURY



- 1 million accidents per year
- Over 100,000 death/year
- Overall, 1 accident per minute and 1 death in every 4 minutes
- Per 1 million km driven there are 6 deaths in India
- In US 1 death per 1.6 million km driven
- 100,000 accidents occurs when driver is sleeping and among them 12000 die

# HEAD INJURY

- 14 people die every hour in India (Times of India 24<sup>th</sup> Feb. 2010)
- In 2008 1.25 lakhs committed suicide in India
- In every hour (Times of India 24<sup>th</sup> Feb. 2010)



# HEAD INJURY



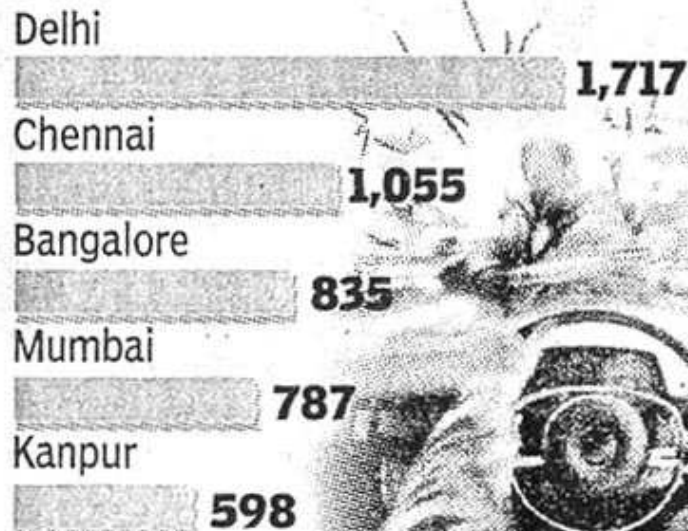
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## 280 die in Indian road accidents every day

Vishwa Mohan | TNN

### HEAVY TOLL

#### WORST 5 CITIES (Deaths In 2005)



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# HEAD INJURY



## 2005 stats show TN has highest accident deaths

Vishwa Mohan | TNN

### STATES (In 2005)

Tamil Nadu	13,961
Andhra Pradesh	10,944
Maharashtra	10,613
Uttar Pradesh	9,860
Karnataka	6,876
Rajasthan	6,793
Madhya Pradesh	5,361
Gujarat	5,264
West Bengal	4,364
Haryana	3,282

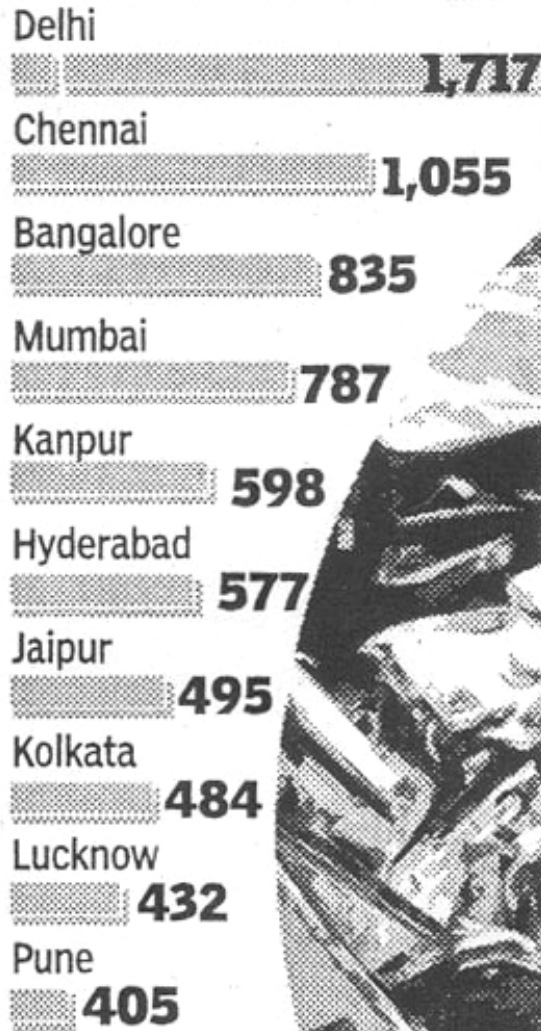


# HEAD INJURY



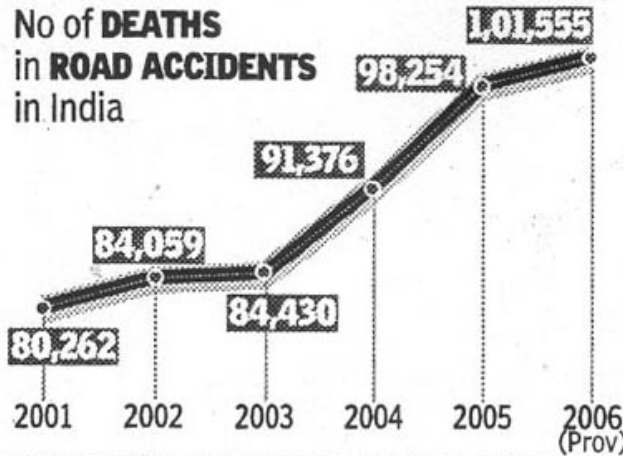
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## CITIES (In 2005)

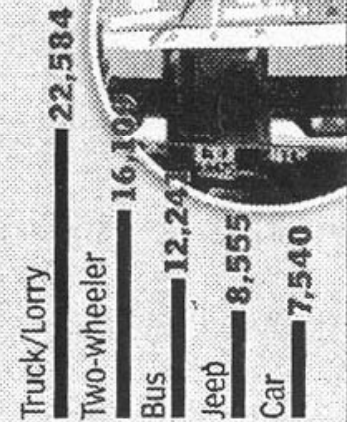


## DEATH TRAPS ON ROADS

No of **DEATHS**  
in **ROAD ACCIDENTS**  
in India



Types of **VEHICLES**



# HEAD INJURY



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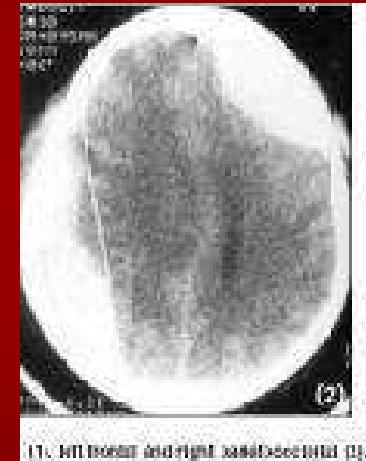
Overall incidence has decreased in

- USA
- UK
- Japan
- Australia



In 10 year

- 50% decrease of accident in Europe
- 50% increase of accident in India



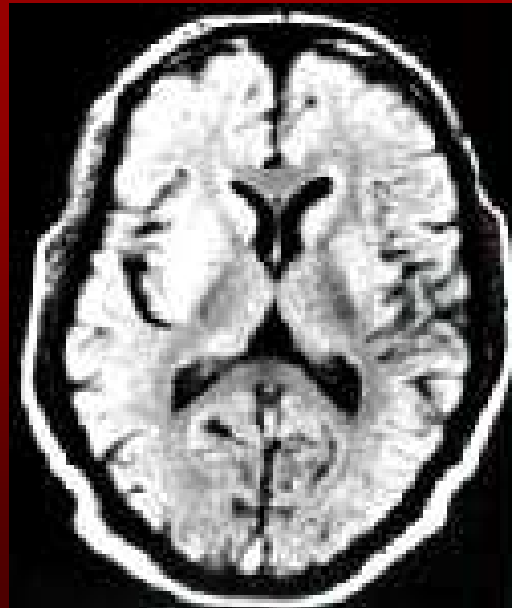
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# HEAD INJURY



## WHO 1983

- If anyone dies before age of 45 in a developed country it will be likely due to Head Injury.



# HEAD INJURY



- In US 1 Death per 1.6 million km driven
- In India 6 Deaths per 1 million km driven

# HEAD INJURY



- Number of vehicle in India is 1% of World vehicle
- Number of accidents 16% all accidents in World
- 3% GDP
- 40% death highway
- 40% death during transport
- 20% in ward



# HEAD INJURY



## IN INDIA

- Number of vehicle in India has increased very much
- In Delhi, 1980, 5 lakhs vehicle, in 2006 / 5.2 million vehicle
- In 1980 Delhi's population was 4 million, Now (2006) 16 million
- Delhi's Vehicular population is increased by 2 lakhs every year (500 car registered in a day)

# HEAD INJURY



## IN DELHI

Year	No.of Accidents	No.of Deaths
1995	7216	2003
1996	11315	2286
1997	15584	2176
2001	8113	1778
2002	6800	1660
2003	5600	1173
2009	> 15000	2200

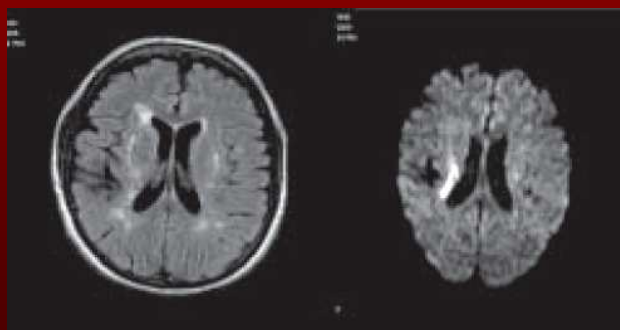
# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

## IN BANGALORE

Year	No. of Accidents	No. of Deaths
1999	8000	800
2000	7000	600



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# HEAD INJURY



In Lucknow

Roads converted to Killing Mines

Hit by an irreparable loss

Times of India – 29/01/09

		<u>Accidents</u>	<u>Injury</u>	<u>Deaths</u>
1.	2004	857	596	370
2.	2005	896	611	418
3.	2006	913	875	446
4.	2007	1237	847	490

# HEAD INJURY



## Aetiology

- 70-80% road accidents
- Fall from height
- Assault
- War injury
- Domestic injury
- Natural calamities

# HEAD INJURY



- In India 47000 km Highway on < 2% upto international standard.



# HEAD INJURY



## LOWER INCIDENCE

- In female
- In children and elderly
- In rural area as compared to urban population



# HEAD INJURY



- 60-70% all road accidents associated TBI
- 70% of TBI deaths occur in 24 hours
- 30-40% population in India < 20 yrs

However, 25-28% of all head injury in pediatric

# HEAD INJURY



## GCS 3-15

- Minor : <30 min
- Moderate : 30m-6 hours
- Severe : > 6 hours



# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

- On the spot management
- Management during transport
- Management in casualty
- Management by neurology



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# HEAD INJURY



- Golden hour
- Golden minute
- This is the time by and large lost

In UK one study 2005-2006 Neurosurgeon average time : 4-6 hours



# HEAD INJURY



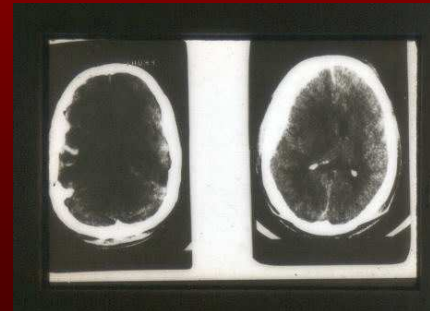
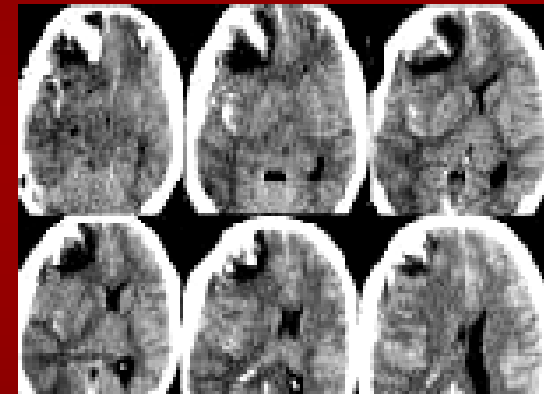
EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

## A. Primary

- Clot, swelling, laceration

## B. Secondary

- Ischemia
- Edema
- Infarct



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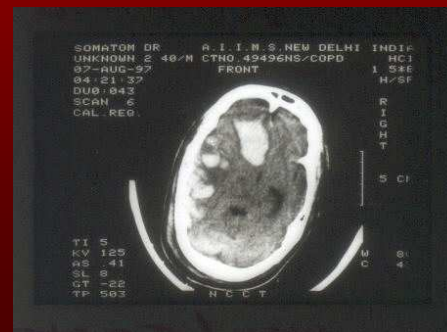
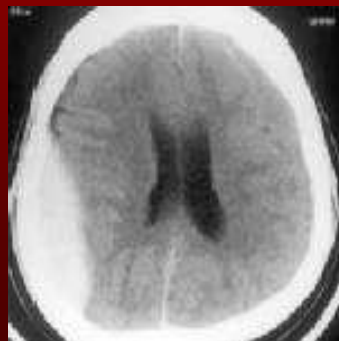
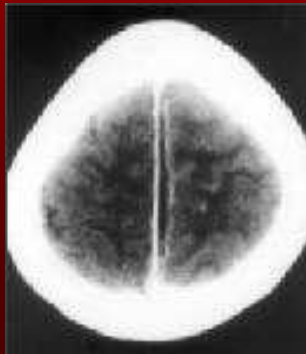
# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

- ◆ Primary damage kills - 40%
- ◆ Secondary damage kills - 60%

Secondary damage → Preventable



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# HEAD INJURY

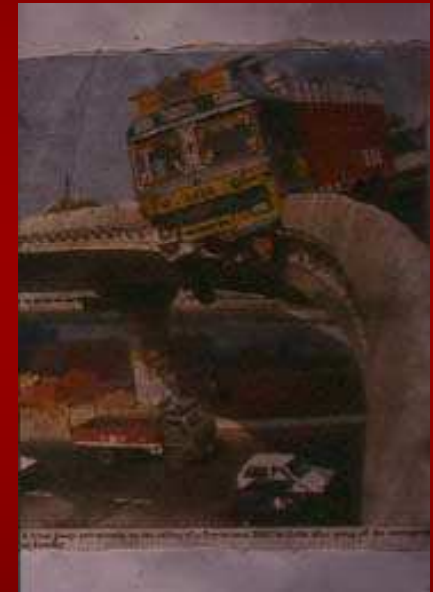


1. What is the aim ?

➤ To save life

2. Is it possible ?

➤ Yes



# HEAD INJURY



- How to ↓ death
- Quick resuscitate
- Quick transport
- Proper ICU care
- Early treatment



# HEAD INJURY

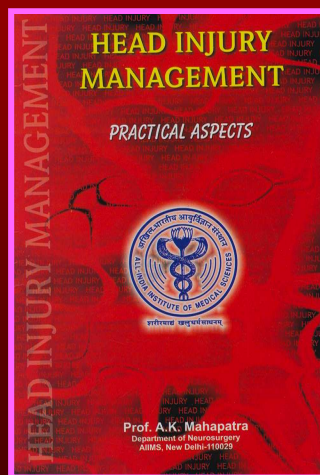
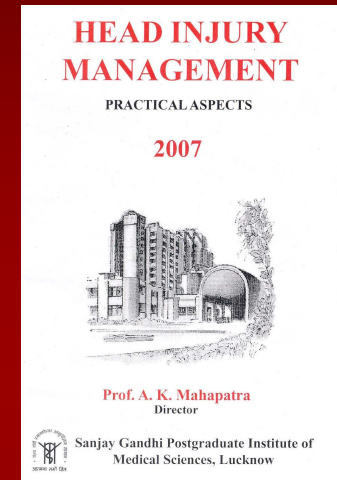


EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

- Primary care
- Airway
- Breathing
- Circulation

15% may have shock

BP < 90



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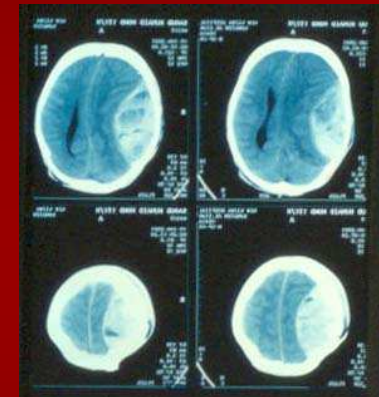
# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

Surgery required in 2 – 5%

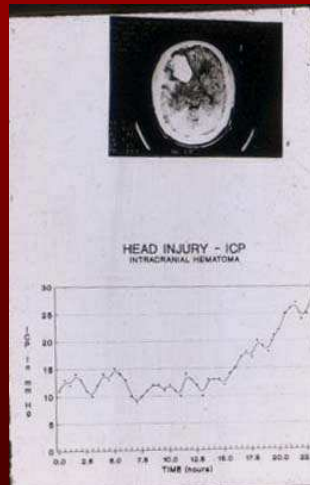
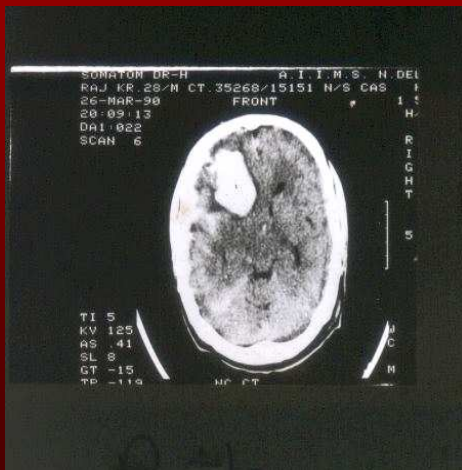
- Large clot (A & B)
- Compound injury (C)



A

B

C



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# HEAD INJURY



- Why operate ?
- To reduce ICP
- $\uparrow$  ICP reduce blood flow to brain
- $\downarrow$  Brain damage by ischaemia



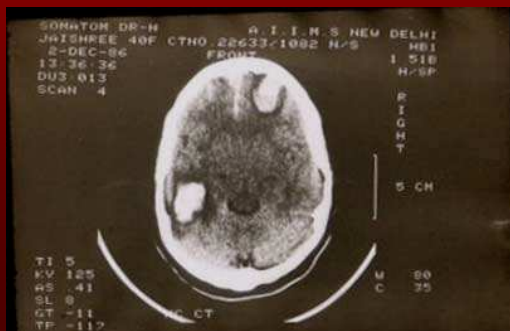
# HEAD INJURY



Does every clot need surgery ?

**NO**

- Clot → does not mean surgery
- Surgery → does not mean cure
- Surgery ↑ chance of survival



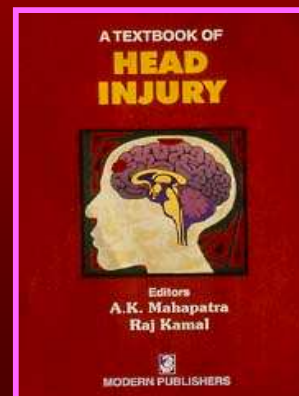
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# HEAD INJURY



- 30% can die without  $\uparrow$  ICP
- Primary damage to brain stem
- 70% die due to  $\uparrow$  ICP



# HEAD INJURY



## Outcome is multifactorial

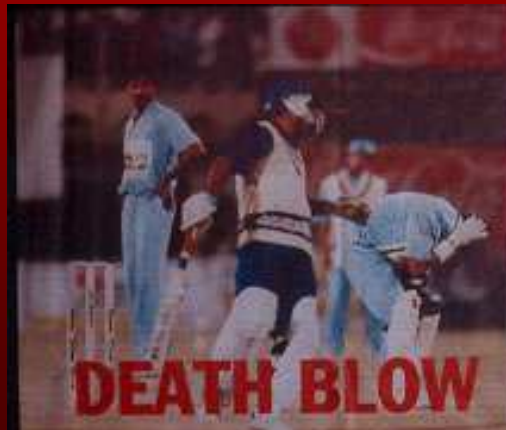
- Age
- Degree of damage to brain
- Associate injury (30-50%)
- Nature of treatment
- Post op care

# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

- Shock is very harmful
- High blood sugar is bad
- Fever, electrolyte disturbances
- Kidney problem ↓ survival



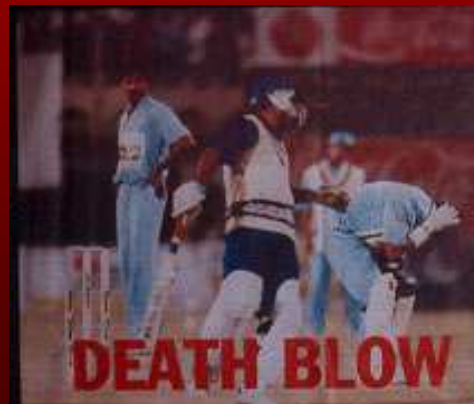
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# HEAD INJURY



## Death(%)

- Minor 5
- Moderate 15
- Severe 50

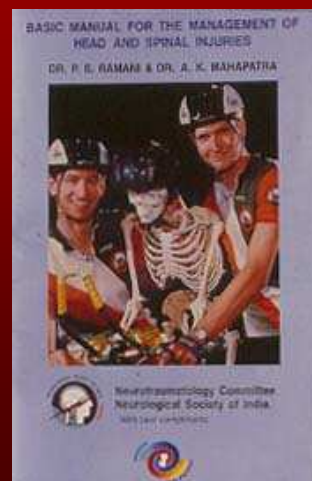


# HEAD INJURY



## In severe head injury

- 50% die
- 25% remain handicap
- 25% good outcome

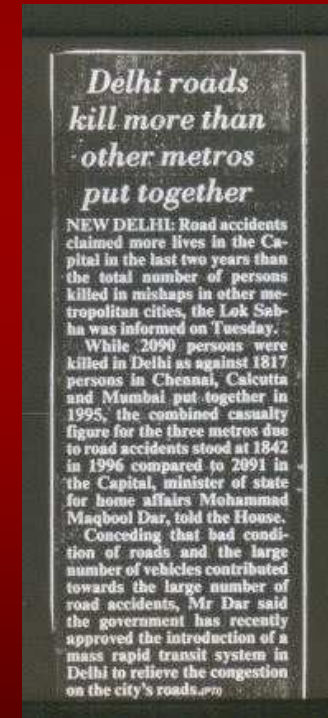


# HEAD INJURY



## FACTORS

- Poor Road
- Old vehicle
- Vehicle without safety
- Inadequately trained driver
- Not following traffic rules
- Lack of implementation of law

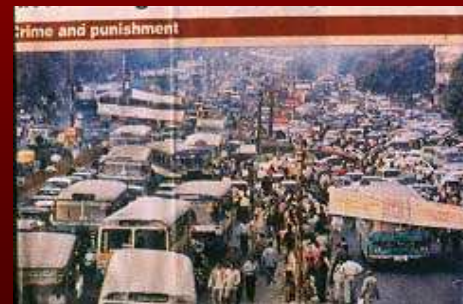
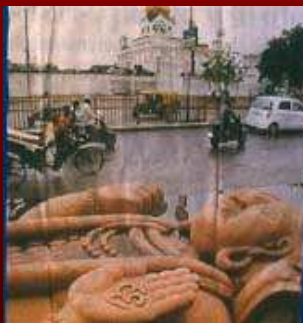


# HEAD INJURY



## (a) Road

- Poor design of road
- Poor lighting
- Inadequate traffic signals
- 1% road international standard
- Poor maintenance



# HEAD INJURY



## (b) Vehicle

- Old vehicles poorly maintained
- No safety measures
- Polluting vehicles
- Failure of break system





# HEAD INJURY



## (c) Driver

- Inadequate training
- Easy availability of license
- Drinking and driving
- Driver feeling sleepy
- Poor hearing or vision or colour blind

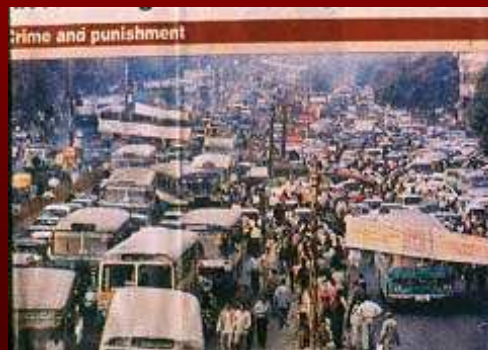
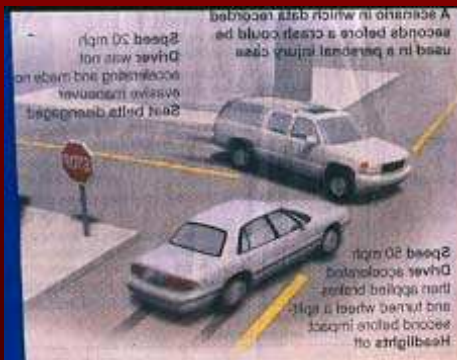


# HEAD INJURY



## Prevention

- (1) Factors in road
- (2) Problems in drivers
- (3) Lack of laws
- (4) Poor implementation of law



# HEAD INJURY



## Inadequate Legislature

- No law to enforce helmet
- Punishment of traffic violation
- Hit and run crime
- Helmet for pillion rider, bicyclist etc.



# HEAD INJURY



## Role of Helmet

- (a) Is helmet is useful?
  - Yes
- (b) What type of helmet?
  - Ideal helmet to have lateral and mandibular protection
  - Properly strapped
- (c) Helmet use for pillion rider – Is a must ?



# HEAD INJURY



- Prevention of Head injury is the best cure for HI
- Head injury is by and large preventable



# HEAD INJURY



- Do you talk while driving ?
- Do you drink and drive ?



# HEAD INJURY



Offence	2002	2003
• Jumping red light	479167	151461
• Over speeding	161365	56633
• Without helmet	254673	111089
• Dangerous driving	49574	17696
• Not wearing seat belt	205453	100453
• No driving license	8219	3769
• Defective no plate	272000	112689

# HEAD INJURY



## CONCLUSIONS

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- We as public have tremendous role
- Use of safety measures are important
- Everyone must follow traffic rules
- Law must be enforced religiously



# HEAD INJURY



## CONCLUSIONS

- TBI is in rise in developing countries
- In India it is a great public health problem
- Head injury can be prevented
- Prevention of head injury is the motto
- With everyone's concern HI is likely come down in next decade

# HEAD INJURY



EPIDEMIOLOGY, CLINICAL ASPECT & PREVENTION

# THANK YOU

