TRAPS – The Royal Adelaide stroke disability Prevention Study

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Stroke management

- Stroke prevention
  - 80% attributable to known risk factors[1]
  - Uncertain how this applies in clinical practice, but significant scope for improvement in prevention[2]
- Stroke intervention
  - TPA reduces stroke-associated disability[3]
  - 5-10% ischaemic stroke patients receive TPA[4,5]

1. Hankey G Stroke 2006; 37:2181-88
2. Sturm JW et al MJA 2002; 176: 312-316
3. NINDS rt-PA Stroke Study Group. N Engl J Med 1995;333(24):1581-7
4.Szoeke CE et al. Med J Aust. 2003 Apr 7;178(7):324-8
5. Bray JE et al. Intern Med J. 2006 Aug;36(8):483-8

- TRAPS – The Royal Adelaide stroke disability Prevention Study
  - How many patients could potentially have had their stroke prevented
  - How many of these patients could potentially have their stroke disability prevented by tPA under optimal conditions

Methods

- Consecutive inpatient admissions to stroke unit over 1 year
- Inclusion criteria
  - Stroke diagnosed by consultant neurologist
  - Patient or proxy able to give consent

Methods

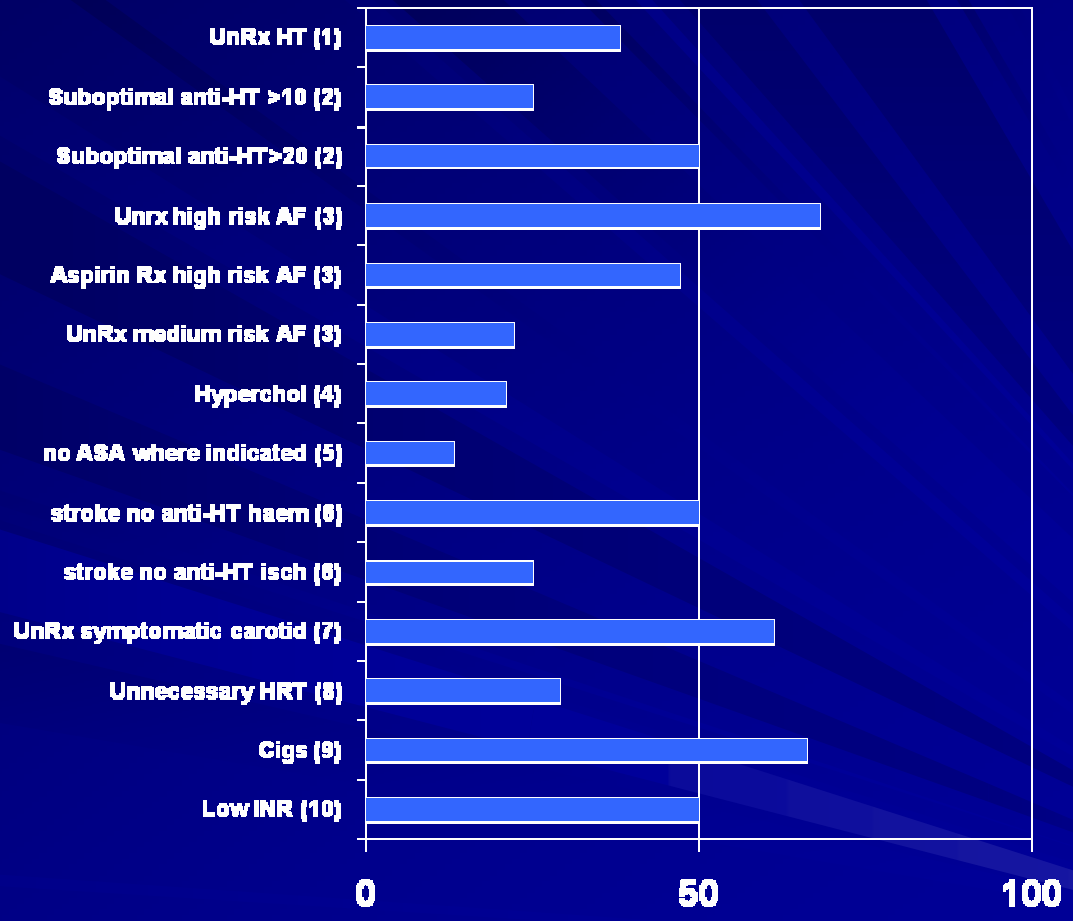
- Modifiable risk factors prospectively defined
  - Assigned stroke preventability weighting
- Patients modifiable RF identified
  - Present and past treatments analysed and compared to accepted national guidelines
- Reasons for treatment deficiencies explored
  - Where no adequate reason, responsibility assigned
- Stroke classified as 0-100% preventable, using most potent suboptimally modified risk factor

Risk factors

- Hypertension[1]
- Atrial fibrillation[2]
- Hypercholesterolaemia[3]
- Suboptimal antiplatelet therapy[4]
- No antihypertensive Rx post-stroke normal BP[5]
- Untreated symptomatic carotid stenosis[6]
- Hormone replacement therapy[7]
- Smoking[8]
- Suboptimal warfarin therapy[9]

1. ISH writing group J Hypertens 2003; 21: 651-663
2. *Arch Intern Med* 1994; 154: 1449-1457
3. CTT collaborators Lancet 2005; 366:1267-278
4. Algra A, Van Gijn J J Neurol Neurosurg Psych 1999;66:255
5. PROGRESS collaborative group Lancet 2001; 358: 1033-1041
6. Rothwell PM et al Lancet 2003; 361:107-116
7. Magliano DJ et al BJOG 2006; 113:5-14
8. Hankey GJ J Cardiovasc Risk 1999; 6:207-211
9. Reynolds MW et al, Chest 2004; 126: 1938-1945, Hylek EM et al N Engl J Med 1996; 335: 540-546

Stroke preventability assigned to risk factors



1. Macmahon S, Rodgers A J Hypertens 1994; 12(Suppl10):S5-S14

2. APCSC J Hypertens 2003;21:707-716

3. Hankey G MJA 2001; 174: 234-239

4. CTT collaborators Lancet 2005; 366:1267-278

5. Algra A, Van Gijn J J Neurol Neurosurg Psych 1999;66:255.

6. PROGRESS collaborative group Lancet 2001; 358: 1033-41

7. Rothwell PM et al Lancet 2003; 361:107-116

8. Magliano DJ et al BJOG 2006; 113:5-14

9. Hankey GJ J Cardiovasc Risk 1999; 6:207-211

10. Reynolds MW et al, Chest 2004; 126: 1938-1945

strokes preventable

=

strokes with modifiable RF

X

% stroke preventability

- Thrombolysis
  - Patients who could potentially have been thrombolysed but weren't
  - ARR 14% or NNT=7 to prevent disability[1]

1. NINDS rTPA Stroke Study Group N Engl J Med 1995; 333: 1581-1587

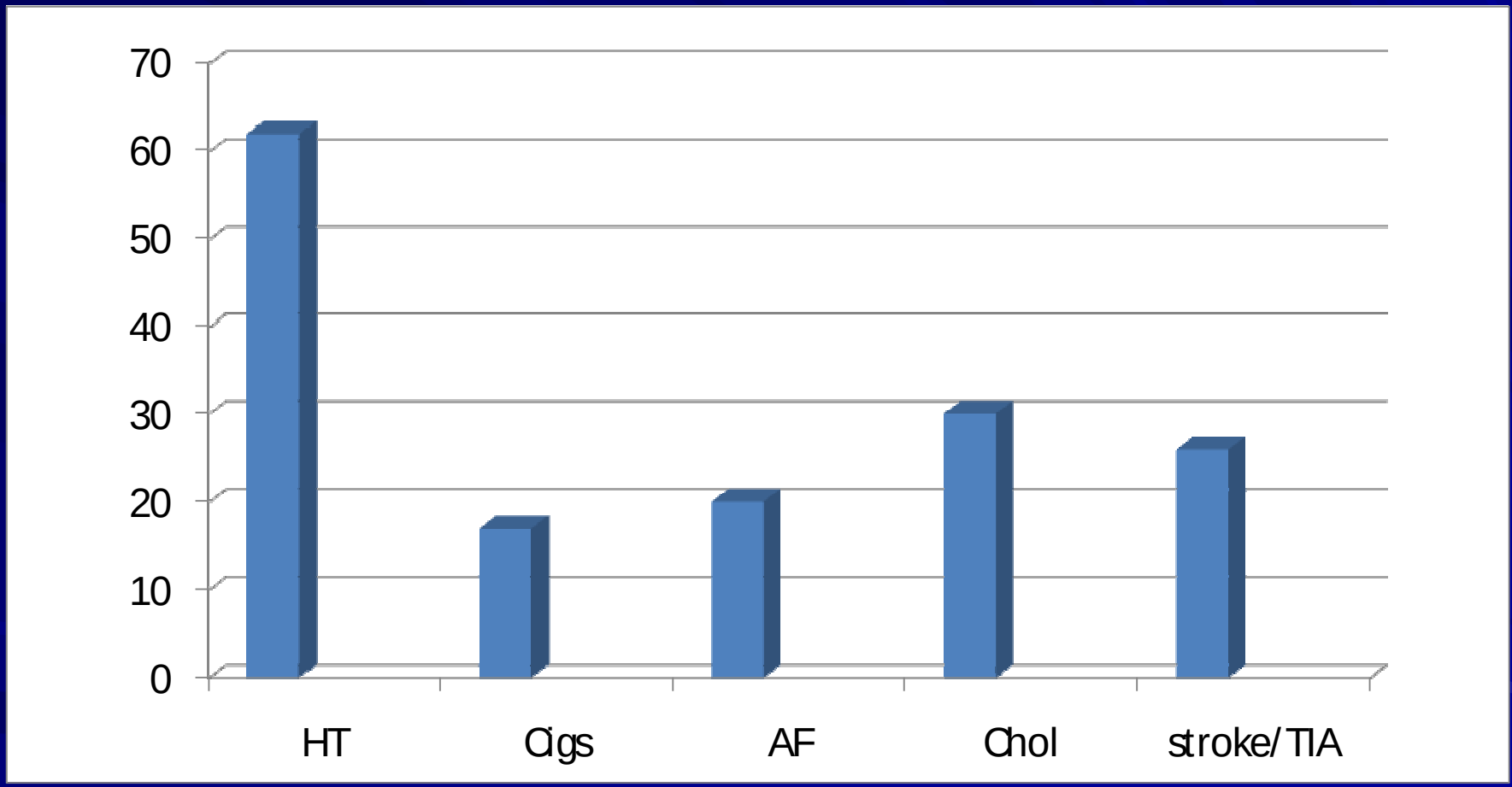
Results

- 306 patients admitted
  - 47 excluded
    - 43 other Dx
    - 1 died before assessment
    - 1 unable to give consent (dementia and no proxy)
    - 2 patient from overseas with non-English speaking GP
  - Total 259 patients in study

Demographic characteristics

- Median age 75 (Interquartile range 61-81)
- 56% male
- 28% ESL
- 30% live alone
- 255/259 identifiable medical practitioner (98%)

Previously identified risk factors



Preventability 1: Blood pressure

- 246/259 recordable BP (132 (+/-18)
- 59 (24%) had not reached target
  - 2 SE
  - 19 patients refusal/DNA
  - 38 no justifiable reason from doctor
- Patients much less likely to meet target blood pressure if =<130
  - OR 6.9 (p<0.001)

Preventability 2: Atrial Fibrillation

- 74/259 AF-related
- 48 previously Dx AF
  - Only 18 on appropriate therapy
  - 21 untreated or aspirin treated
  - 9 suboptimal anticoagulation

Preventability 3: Other

- Smoking
  - 45/259 smokers – only 4 failed therapy
- No antiplatelet therapy despite indication
  - 18/259
- No antihypertensive Rx post-stroke normal BP
  - 12/259
- Untreated symptomatic carotid stenosis
  - 2/131

Preventability 4

- Nearly all patients on appropriate statin therapy
  - 73/79 on statin
  - All but 8 met target (4/8 resistant)
- No patient on unjustifiable HRT
  - 4 patients, all intractable Sx or OP, other meds failed

Overall results

- 135/259 (52%) had at least one suboptimally modified RF
  - 1 patient 4 risk factors
  - 8 patients 3 factors
  - 18 patients 2 risk factors
  - 108 patients 1 factor

Average ‘preventablity’ of 49% x 135 strokes

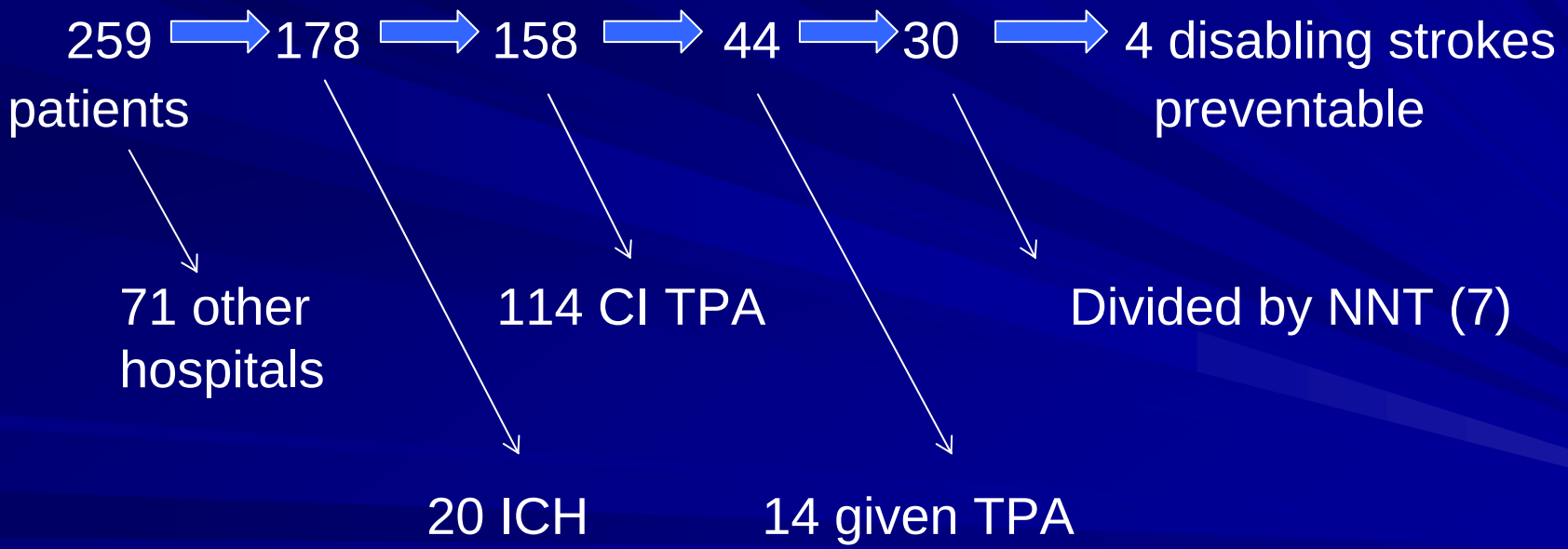
=

66/259 or just over 25% of strokes preventable

- 64/135 preventable strokes disabling (mRs>=4)
  - Therefore 31 disabling strokes preventable

- Strong association with younger age (<75)
  - OR 2.09 (1.28-3.44) (p0.005)
    - Higher rate of smoking
    - More likely to have lower BP target
- Trend towards association with rural origin
  - OR 1.73 (0.99-3.04)
- No association with social isolation, ESL or gender

Potential for TPA



Limitations

- Selection biases
  - Not a population study
    - Minor strokes
    - Deaths before admission
    - Nursing home patients
  - Stroke unit based
    - Severely demented and nursing home patients (generally) not included
    - SAH and ICH requiring neurosurgeons not included
    - Country referrals biased towards younger, unusual and complex cases

Summary

- Prevention of stroke
  - 50% have suboptimally modifed RF
    - Stroke in the young
    - Cigarette smoking
    - Blood pressure control (especially reaching lower targets)
    - Atrial fibrillation
  - Almost all had access to treating doctor
- Intervention
  - Thrombolysis rates can/should be improved
  - Overall benefit applies to few

Conclusion

Best practice stroke prevention far outweighs best practice stroke cure

Be aware of TRAPS