Decision analysis supports unicompartmental replacement as primary surgical treatment for advanced antero-medial gonarthrosis

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Introduction

Evidence based surgical decision making:

- Multiple variables and parameters
- Ranges of reported outcomes
- Various sources of evidence

Individual surgeon belief system

- Belief system continuously updated and modified
- Multiple permutations: intuitive assessment difficult

Introduction

UKA vs TKA as surgical treatment of anteromedial compartment osteoarthrosis of the knee:

- Initial morbidity and outcome
- Revision and re-revision rates & outcome
- Cost, facility utilization

Optimize outcome

Minimize morbidity, cost, facility utilization

Methods

- Cohort analysis of 100 patients
- age 60 y
- end-stage anteromedial gonarthrosis
- define initial and subsequent procedures
- quantify procedure related parameters
- assume linear procedure attrition rate
- option to superimpose natural mortality

Methods

- each revision creates a new sub-cohort
- each sub-cohort has a linear attrition rate
- tabulate various procedures:

  determine cohort morbidity

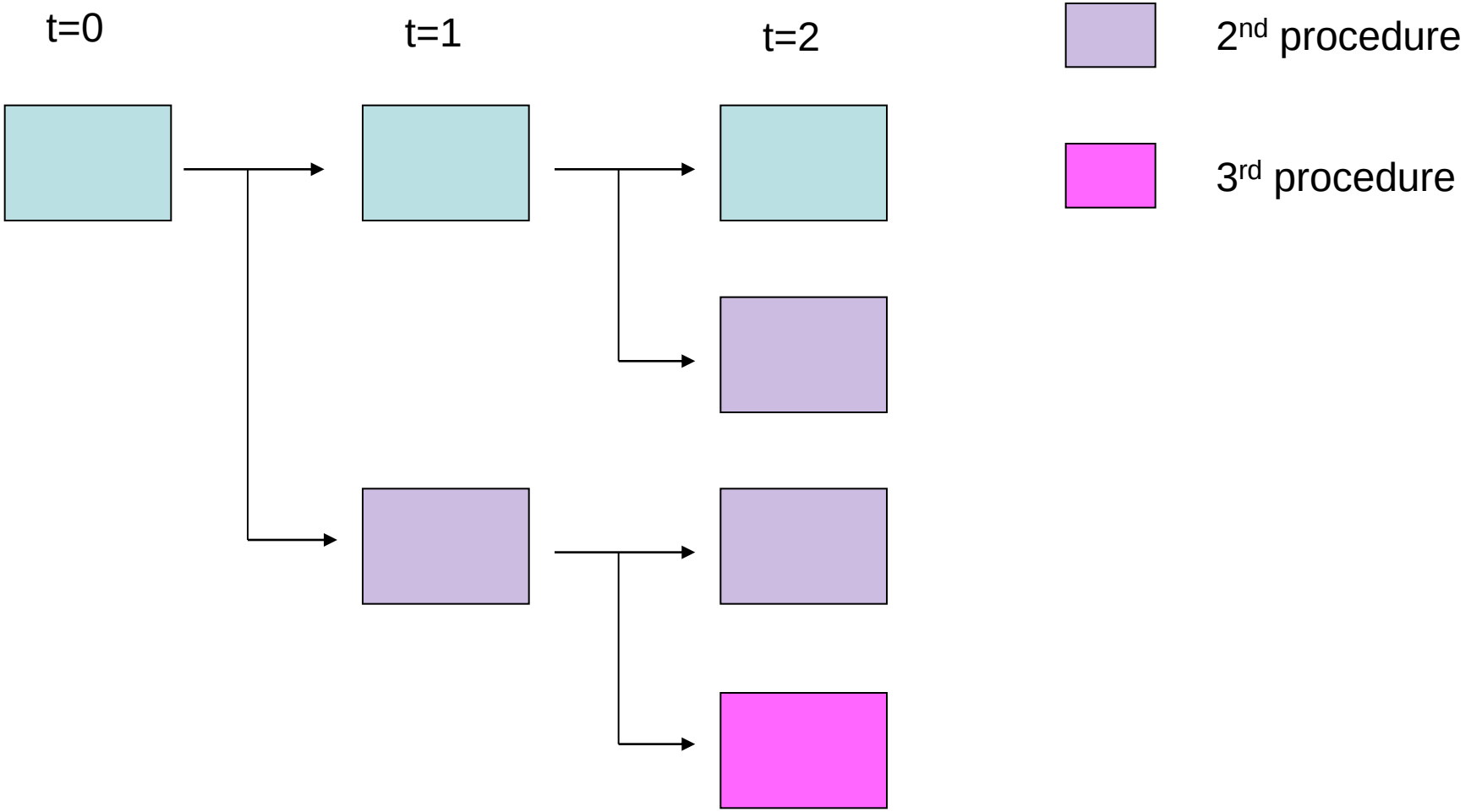
  determine cohort resource utilization

Methods

- Initial model:
  - 20 y period - 5 year intervals
  - sub-cohorts introduced sequentially
  - allowance made for interim failure
- Current model:
  - interval shortened to 1 year
  - user defined cap on revision number
    → ‘salvage’
  - allows more flexibility

Methods

- General principle



Methods

UKA: 10 y survival 70-85-95%
Infection rate 0.5%
Hospital stay: 1 day

TKR: 10 y survival 90-95%
Infection rate 1%
Hospital stay 3 days

UKA → TKA: similar to primary TKA

TKA → RevTKA: 10 y survival 85%
Infection rate 2%
Hospital stay 5 days

Subsequent revisions: see abstract

Results

- UKA → TKA → revision TKA → ……

1/ 10 y survival:

UKA 95%/TKA 95%/RevisionTKA 85%

No mortality Adjusted

Procedures:

Infections:

Length of stay:

Results

- UKA → TKA → revision TKA → ……

1/ 10 y survival:

UKA 85%/TKA 95%/RevisionTKA 85%

No mortality Adjusted

Procedures:

Infections:

Length of stay:

Results

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1/ 10 y survival:

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Results

- TKA → revision TKA → ……

1/ 10 y survival:

TKA 95%/RevisionTKA 85%

No mortality Adjusted

Procedures:

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Length of stay:

Results

- TKA → revision TKA → ……

1/ 10 y survival:

TKA 90%/RevisionTKA 85%

No mortality Adjusted

Procedures:

Infections:

Length of stay:

Discussion

- UKA as primary treatment option:

  - more procedures

  - reduced cohort infection/ hospital utilization within accepted 10y survival range (>85%)

  - cohort infection/hospital utilization similar when UKA 10y survival approaches 70%

Conclusion

- Decision analysis/ cohort modelling allows assessment of implications of surgeon's perception of relevant outcome parameters
- Results of cohort modelling suggest that UKA as primary treatment for medial OA of the knee reduces cohort infection and hospital utilization

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