Role of Surgery in Cancer Prostate

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Some entirely unrelated history of medicine...

The roots are in urology...

Walker, Anthony., Physick, 1763
Panderen, Egbert van, 1581-1637
**Prostate Cancer**

*Highest in Incidence and Second in Cause of Death from Cancer in American Males*

<table>
<thead>
<tr>
<th>Incidence</th>
<th>Cause of Death</th>
</tr>
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<tbody>
<tr>
<td>Melanoma of Skin 4%</td>
<td>4% Esophagus</td>
</tr>
<tr>
<td>Oral Cavity &amp; Pharynx 3%</td>
<td>31% Lung &amp; Bronchus</td>
</tr>
<tr>
<td>Lung &amp; Bronchus 15%</td>
<td>6% Pancreas</td>
</tr>
<tr>
<td>Pancreas 2%</td>
<td>3% Kidney</td>
</tr>
<tr>
<td>Colon &amp; Rectum 10%</td>
<td>4% Liver</td>
</tr>
<tr>
<td>Kidney 4%</td>
<td>9% Colon &amp; Rectum</td>
</tr>
<tr>
<td><strong>Prostate 29%</strong></td>
<td>9% Prostate</td>
</tr>
<tr>
<td>Urinary Bladder 7%</td>
<td>3% Urinary Bladder</td>
</tr>
<tr>
<td>Leukemia 3%</td>
<td>4% Leukemia</td>
</tr>
<tr>
<td>Non-Hodgkin’s Lymphoma 4%</td>
<td>3% Non-Hodgkin’s Lymphoma</td>
</tr>
<tr>
<td>All Sites 766,860</td>
<td>289,550 All Sites</td>
</tr>
</tbody>
</table>

**2007 Estimates**

- 219,000 New Cases
- 27,000 Deaths

**National Cancer Registry**

- **Bangalore**: 2.1 per 100,000 cases
- **Mumbai**: 3.5
- **Delhi**: 3.6
- **Chennai**: 4.0
Autopsy data

- 30% of men older than 50 years
- 70% of men older than 80 years
- Lifetime risk of developing clinically detected prostate cancer: 16%.
PSA era

1960 – Albin et al, novel seminal protein

1971 – Hara et al, protein unique to seminal fluid

1979 – Wang et al, PSA


1987 – Stamey et al, first clinical study on utility of PSA in prostate cancer.
**T1:** Microscopic tumor confined to prostate and undetectable by a digital rectal exam (DRE) or ultrasound

- **T1a:** found in 5% or less of prostate tissue sample
- **T1b:** found in more than 5% of a prostate tissue sample
- **T1c:** identified by needle biopsy as a follow-up to screening that detected elevated PSA results

**T2:** confined to prostate and can be detected by DRE or ultrasound

- **T2a:** involves less than half of one lobe
- **T2b:** involves more than half of one lobe
- **T2c:** involves both lobes of the prostate

**T3:** Spread to surrounding tissues or to the seminal vesicles

- **T3a:** Spread on only one side
- **T3b:** Spread on both sides
- **T3c:** Spread to one or both of the seminal tubes

**T4:** Still within the pelvic region but may have spread to organs near the prostate

- **T4a:** Spread to the bladder neck, the external sphincter, and/or the rectum
- **T4b:** May affect the levator muscles / pelvic wall.
Prostate Cancer Trends
Influence of PSA Assay

Christian Medical College, Vellore
Treatment options for prostate cancer

- Observation alone.
- Radical prostatectomy.
- Radiation therapy.
Cumulative incidence of distant metastasis and of death from any cause
Carcinoma prostate

Curative
- Organ confined
  - Radical Prostatectomy
    - Open
    - Laparoscopic
    - Robotic
- Locally advanced
- Metastatic
  - Bilateral Orchidectomy
- Palliative
  - Cord compression
    - Lower tract
      - TURP
    - Upper tract
      - DJ stenting (Ante/retrograde)
  - Obstruction
    - PCN

Surgical fixation (vertebral fracture)
Laminectomy (Cord compression)
Localized Prostate cancer

- Confined to the prostate gland
- T1 or T2 lesion.
- Radical prostatectomy – gold standard?
Factors to be considered for surgical management

- Patient selection
- Risk stratification
- Pre-operative counseling
- Surgical options
- Post-operative complications
Radical prostatectomy
Patient selection

- Less than 60 yrs
- Good general health
- Life expectancy >10yrs
- No life threatening ancillary disease
- Removal of entire prostate and seminal vesicle
- Pelvic lymphadenectomy for staging
- Preservation of distal sphincter
- Preservation of cavernosal nerves - to prevent impotence
- Clinically localized T1, T2 & T3
Risk stratification for clinically localized prostate cancer

**Low risk**
Diagnostic PSA < 10.0 ng/mL and
Highest biopsy Gleason score < 6 and
Clinical stage T1c or T2a

**Intermediate risk**
Diagnostic PSA > 10 but < 20 ng/mL or
Highest biopsy Gleason score = 7 or
Clinical stage T2b

**High risk**
Diagnostic PSA > 20 ng/mL or
Highest biopsy Gleason score > 8 or
Clinical stage T2c/T3
PSA = prostate-specific antigen

*D’Amico et al*
Rationale for surgical treatment

- Only 9-10% of cancers detected by PSA were indolent.
- 23% of T1c cancers and 40% of T2 tumours had advanced pathologic features.
- High likelihood of cure for tumours detected early.
Surgical options

- Radical retropubic prostatectomy
- Radical perineal prostatectomy
- Laparoscopic radical prostatectomy
- Robotic prostatectomy
Open Surgical Approach

- 3-4 hours, general anesthesia.
- Incision: 8 cm
  Begins just below navel and extends to pubic bone.
- Remaining Urethra is sewn to bladder neck over a catheter.
Lateral endopelvic fascia has been incised

Prostate 'shoulder'

Suturing proximal venous complex (decrease backbleeding and improve exposure of prostate shoulders)
'Spared' puboprostatic ligaments

Dorsal venous complex controlled
Placing left anterolateral suture

urethral cuff

downward pressure on prostate
anterolateral sutures

anterior, apex of prostate
Posterior urethra

Left NVB
Placing left posterolateral suture

Left NVB

Prostate apex under sponge-stick
Tapered bladder neck

Everted mucosa (4-0 chromic)
Tying sutures
Complications

Bleeding
Incontinence
Erectile dysfunction
Laparoscopic Radical Prostatectomy

- Eliminates the need for a incision by using a telescopic instruments called a laparoscopes.
- Small camera attached to the laparoscope allows the surgeon to view inside the abdomen.
- More rapid recovery
- Unclear if any benefit for cancer cancer control, urinary or sexual function.
The Da Vinci system: Robotic Prostatectomy

- Surgeon operates from a console with a 3-D screen.
- Grasp controls to manipulate surgical tools within the patient.
- Robotic arms translate finger, hand, and wrist movements.
- Shortens learning curve of surgeons.
- Very High-Precision
- Cost, Benefit unclear
Comparison of all three types of Radical prostatectomies

<table>
<thead>
<tr>
<th>Variables</th>
<th>Open Radical Prostatectomy (reference values)</th>
<th>Laparoscopic Radical Prostatectomy(^{19}) (OR)</th>
<th>Robotic Prostatectomy(^{17}) (OR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating room times</td>
<td>163 min</td>
<td>1.51(\dagger)</td>
<td>0.91(\ddagger)</td>
</tr>
<tr>
<td>EBL</td>
<td>910 mL</td>
<td>0.42(\dagger)</td>
<td>0.10(\dagger)</td>
</tr>
<tr>
<td>Positive margins</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Complications</td>
<td></td>
<td>0.67(\dagger)</td>
<td>0.33(\dagger\ddagger)</td>
</tr>
<tr>
<td>Catheter time</td>
<td>15.8 days</td>
<td>0.50(\dagger)</td>
<td>0.44(\dagger)</td>
</tr>
<tr>
<td>Hospital stay &gt;24 hr</td>
<td></td>
<td>0.35(\dagger)</td>
<td>0.07(\dagger\ddagger)</td>
</tr>
<tr>
<td>Postoperative pain score scale (0–10)</td>
<td>7</td>
<td>0.45(\dagger)</td>
<td>0.45(\dagger)</td>
</tr>
<tr>
<td>Median time to continence</td>
<td>160 days</td>
<td>1</td>
<td>0.28(\dagger\ddagger)</td>
</tr>
<tr>
<td>Median time to erection</td>
<td>440 days</td>
<td>NA</td>
<td>0.4(\dagger)</td>
</tr>
<tr>
<td>Median time to intercourse</td>
<td>&gt;700 days</td>
<td>NA</td>
<td>0.5(\dagger)</td>
</tr>
<tr>
<td>Detectable PSA</td>
<td>15%</td>
<td>1</td>
<td>0.5</td>
</tr>
</tbody>
</table>

EBL = estimated blood loss; NA = not available, because most patients undergoing laparoscopic radical prostatectomy were not sexually active at baseline; PSA = prostate-specific antigen.

\(\dagger\) The reference values were those from conventional radical prostatectomy. OR was the ratio of the observed to the reference value.

\(\ddagger\) P < 0.05 vs robotic prostatectomy.

\(\dagger\ddagger\) P < 0.05 vs laparoscopic radical prostatectomy.

Adapted from BJU Int\(^{17}\) and J Urol\(^{19}\)
Trifecta nomogram

Probability of BCR (biochemical recurrence) with time

Probability of continence recovery after RP
Treatment metastatic disease

- Mainly palliative
- Eliminates symptoms in most symptomatic patients
- Prolongs time to clinical progression
- Prolongs survival
Results of Androgen Removal

**Bilateral orchidectomy**
- Gold standard
- Done under local anesthesia
- Rapid lowering of serum testosterone level
- Side effects less
- Cost effective
- Testicular prosthesis – cosmetic result

**Side effects**
- Impotence
- Loss of sexual desire (libido)
- Hot flashes
- Weight gain
- Fatigue
- Loss of muscle and bone mass
Locally advanced

- TURP
- PCN
- DJ STENT
- In conjunction with HRPC status
Bony metastases

Prophylactic surgical fixation - indications

1. lytic lesion
2. in a weight bearing bone
3. equal to or more than 50% of the C.S diameter.
4. >2.5 cms in length.
5. impending cord compression.
6. in the region that had received RT before.
Is cure necessary in those in whom it may be possible, and is cure possible in those in whom it is necessary?

Whitmore
Prostate Cancer

A pound of prevention, ounce of cure
Thank You