Therapy-Related Changes

COMMON AGENTS THAT CAUSE IATROGENIC CHANGES IN PAP SMEARS

- Chemotherapy.
- Cautery.
- Intrauterine device, diaphragm, pessary.
- Laser.
- Postinstrumentation: biopsy.
- Radiation therapy.

CYTOLOGICAL FEATURES OF RADIATION THERAPY (FIG. 17.1)

- Cytomegaly.
- Karyomegaly.
- Normal nuclear-to-cytoplasmic (n:c) ratio.
- Bizarre cell shape.
- Multinucleation.
- Nuclear wrinkling and smudging.
- Altered nuclear and cytoplasmic staining.
- Nuclear and cytoplasmic vacuolization.
- Intracytoplasmic neutrophils.

Acute Radiation Changes (Fig. 17.2)

- Large cell with normal n:c ratio.
- Nuclear membrane is irregular.
- Multinucleation is common.
- Pleomorphism.
- Dirty background.
- Leukophagocytosis.
- Smudged nuclear chromatin.
- Cytoplasmic vacuoles.

Chronic Radiation Change

- Some changes of acute radiation effect persist.
- Pale smudged nuclei.
Table 1
Radiation Atypia vs Squamous Intra-Epithelial Lesion

<table>
<thead>
<tr>
<th>Cells</th>
<th>Radiation</th>
<th>Squamous intra-epithelial lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of cells</td>
<td>Single/loose aggregates</td>
<td>Single/aggregates</td>
</tr>
<tr>
<td>N:c</td>
<td>Normal</td>
<td>Increased</td>
</tr>
<tr>
<td>Nucleus</td>
<td>Dark, vacuolated</td>
<td>Hyperchromatic</td>
</tr>
<tr>
<td></td>
<td>Rnlarged, multiple</td>
<td>Enlarged</td>
</tr>
<tr>
<td>Nuclear</td>
<td>Smooth</td>
<td>Irregular</td>
</tr>
<tr>
<td>Contour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nucleoli</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Cytoplasm</td>
<td>Vacuolated</td>
<td>Granular</td>
</tr>
</tbody>
</table>

-, absent; +, present.

Fig. 17.1. Radiation effect in a Pap smear. “Streaming” sheet of enlarged cells and low nuclear-to-cytoplasmic ratio. Nuclei are enlarged with prominent nucleoli and binucleation, and cytoplasm shows distinct vacuoles. Polychromasia was seen. Compare with Fig. 17.2 (conventional smear; Papanicolaou stain).

- Low n:c ratio.
- Biphasic (psychedelic) cytoplasmic staining.
- Changes of repair and regeneration.
- Liquid-based preparations show less psychedelic staining.