PHOTODYNAMIC THERAPY IN THE MANAGEMENT OF CANCER:
AN ANALYSIS OF 114 CASES

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This article reports on results of treatment of 114 cancer patients at the Cancer Institute, Chinese Academy of Medical Sciences, between September 1981 and December 1984. In September 1981, a study group of clinicians, physicians and basic scientists was set up at the Cancer Institute for the study of photodynamic therapy (PDT) with HPD. During the following 39 months, 114 patients were treated by PDT alone, 8 by PDT + hyperthermia and 3 by PDT + radiotherapy. The analysis in this presentation is based on PDT alone, since the numbers of patients in the other groups is insufficient for statistical analysis.

MATERIAL AND METHODS

All patients were examined physically, and lesions biopsied for histological confirmation. Among our patients, 63 were previously untreated; the others had recurrent disease, or tumors nonresponsive to other modalities. The distribution of cancer sites is shown in Table 1; histology in Table 2.

The photosensitizer HPD was prepared by the Institute of Pharmaceutical Industry, Beijing. It was tested for sterility, and stored at -20 to -30°C. Fluorescence studies in human serum indicated an excitation maximum at 405 nm with the emission maximum at 630 nm.

The light source was a 2-4 watt argon pumped CW dye laser, from the Institute of Electronology, Chinese Academy of Sciences. This provides 625-630 nm light at 250-400 mW, using Rhodamine 640 as the dye medium. At the beginning of each treatment, the light output was measured with a broad power meter with wavelength checked with a monochromator.

Patients received a routine physical examination with histological diagnosis. Each received 5 mg/kg of HPD in 100 ml isotonic saline over 30 min (i.v.). Phototherapy was begun 48-72 hr later. The estimated energy was 150-400 J/cm². All patients were informed of the hazards of photosensitization. If a tumor residue remained after one PDT treatment, or if local recurrence was observed, more courses were given. In this series, 62 patients had one course of PDT; 38 had 2 courses, 10 had...

D. Kessel (ed.), Methods in Porphyrin Photosensitization
Table 1. Distribution of Cancer Sites

<table>
<thead>
<tr>
<th>Site</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>51</td>
</tr>
<tr>
<td>Primary</td>
<td>42</td>
</tr>
<tr>
<td>Metastatic</td>
<td>9</td>
</tr>
<tr>
<td>Head &amp; Neck</td>
<td>27</td>
</tr>
<tr>
<td>Urinary</td>
<td>32</td>
</tr>
<tr>
<td>Cervix</td>
<td>3</td>
</tr>
<tr>
<td>Esophagus</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>114</strong></td>
</tr>
</tbody>
</table>

3 courses; 3 had 4 courses, and 1 had 5 courses. Of these, 54 involved direct irradiation, 129 involved use of a quartz fibre, and 2 were interstitial.

RESULTS

Tumor response was classified into four grades:

1. Complete remission (CR): no evidence of tumor macroscopically and microscopically for one month.
2. Significant remission (SR): >50% of original tumor disappears one month after PDT.
3. Minor remission (MR): <50% of tumor disappears after one month.
4. No remission (NR): no change or continued growth after PDT, or tumor size initially diminishes but returns within one month.

The results of PDT are summarized in Table 3. Three patients (2 basal cell carcinomas, 1 metastatic breast carcinoma) lost to follow-up are counted as no remission. The effectiveness rate (CR + SR + MR) is 85.1%. The longest duration of tumor control was 34 months.

Fourteen patients showed no response. PDT failure may be related to the extent of disease or poor blood supply to the tumor because of marked fibrosis. Tumors not previously treated showed the best response rate, but even in residual or recurrent tumors, the response rate was 76% (Table 7).

Illustrative Cases

A male, 68, formerly a pilot, presented with a 1.5 x 1.5 cm basal cell carcinoma located in his left nasal ala for >13 months. This lesion was treated with PDT (200 J) and a total remission was obtained. This patient has now been followed for 34 months without recurrence (Fig. 1).

A male, 42, peasant, presented with a 3 x 5.5 cm squamous cell carcinoma of the lip observed 8 months before. The energy dose employed was 300-400 J for each course. A complete response was obtained, and biopsies showed no remaining disease (Fig. 2).