especially when treated with RT. Novel therapies should be investigated in patients with solitary plasmacytoma localized in the bone.

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In vivo assessment of radiation induced apoptosis in follicular lymphoma patients by 99mTc-Annexin V scintigraphy.

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Purpose: To study whether radiation-induced apoptosis in follicular lymphoma patients can be visualised in vivo by 99mTc-Annexin-V (TAV) scintigraphy. Annexin V is an endogenous human peptide with a high affinity for membrane-bound phosphatidylserine, which becomes exposed at the outer leaflet of the plasma membrane at an early stage of the apoptotic process.

Methods and patients: TAV scintigraphy was performed in 10 recurrent follicular lymphoma patients (median age 58 years, range 38-78 years) scheduled for local palliative irradiation within 1 week prior to treatment. Planar and SPECT images were performed. Patients were irradiated by 2 fractions of 2 Gy on days 1 and 3, and rescanned on day 4. Fine needle aspiration cytology (FNAC) was performed on days 1, 2, 3, 4 and 5 to evaluate early morphological changes compatible with apoptotis and to investigate the optimal timing for scintigraphy. The study was approved by the local ethical committee.

Results: In 7/10 patients baseline scans were negative. In the 3 patients with minimal TAV uptake at the tumour site on the baseline scan, the pretreatment histopathological specimens confirmed the presence of low levels of spontaneous apoptosis. In 9/10 patients post-treatment scans showed a strong increase in TAV uptake at the irradiated tumour sites as compared with the baseline scans. In 1 patient the post-treatment scan remained negative. In 9/10 patients the cytological response confirmed the presence of apoptotic cells as visualised on the post-treatment scintigraphic images. In 1 patient the cytology was positive for apoptosis whereas the scan was negative. None of the post-irradiation images showed false-positive results. In 9/10 patients findings of apoptosis were predictive of radiotherapy response.

Conclusion: Radiation-induced apoptosis in follicular lymphoma patients can be visualised at early stages in vivo by TAV scintigraphy. TAV scintigraphy may prove an easy and rapid predictive assay for treatment outcome in follicular lymphoma patients.

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Localized mucosa-associated lymphoid tissue (MALT) lymphoma treated with radiation therapy has excellent clinical outcome

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Background: MALT lymphoma has unique clinical-pathological features but remains heterogeneous in etiology, sites of presentation, and biologic behavior. We report the outcome of patients with stage I/II disease treated with a policy of involved-field radiation therapy (RT).

Material/Methods: Between 1989-2000, 103 patients (stage IE, 91; stage IIE, 12) were referred for management, with data collected prospectively since 1992. Median age was 60 yrs, M:F ratio 1:1.9. Transformed MALTs (diffuse large B-cell lymphoma) were excluded. Presenting sites included: stomach 17, orbital 31, salivary glands 24, thyroid 13, other head and neck sites 5, lung 5, urinary bladder 3, skin 2, breast 2, and rectum 1. Staging included site-specific imaging, CT abdomen in 92% and bone marrow biopsy in 80%. Ninety-three patients received RT (RT alone, 85; chemotherapy and RT, 8). Five patients had surgical excision alone, 2 patients with gastric lymphoma received antibiotics alone, and 3 patients refused any treatment. The analysis focused on 93 patients who received RT. The median RT dose was 30 Gy (range 17.5-35 Gy) and the median follow up was 4.9 yrs (range 1.1-10.2 yrs).

Results: A complete response (CR/CRu) to RT was achieved in 92/93 patients, 1 patient had no response (orbit). To date, 3 patients have died (1 due to lymphoma, 1 from a second cancer, 1 from unrelated causes). The 5-yr disease-free survival (DFS) was 77%, and overall survival (OS) 98%. No relapses were observed in 26 patients with stomach or thyroid lymphoma, while 16/67 patients relapsed in the other sites. The 5-yr DFS for gastric and thyroid lymphoma was 94%, in contrast to 71% for other sites ($p = 0.034$), although OS was the same. Among 92 patients with CR, 15 relapsed (4 salivary, 7 orbit, 2 nasopharynx, 1 larynx, 1 breast). Relapse sites: the untreated contralateral paired-organ only, 5 patients (3 orbit, 2 parotid); distant sites, 7 patients; and both local (both parotid) and distant sites, 2 patients. The overall local control rate with RT was 96% (89/93 patients). The locations of distant relapse were commonly in MALT sites rather than lymph nodes. Among the 16 patients with residual/recurrent MALT lymphoma, 10 were rendered disease-free again with additional courses of RT (7 patients), chemotherapy (1 patient), and CMT (2 patients), with a median follow up of 3.8 years from first relapse.

Conclusions: Moderate-dose RT achieved excellent local control in localized MALT lymphomas. Relapses were observed in non-irradiated paired-organs or distant sites. Gastric and thyroid MALT lymphomas had better outcome. Patients with recurrence of lymphoma generally responded to further treatment with prolonged survival despite the relapse(s).

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Improved survival at the cost of neurotoxicity in primary CNS lymphoma (PCNSL). Long-term follow-up of a Phase 2 multicentre combined modality study (Trans-Tasman Radiation Oncology Group - TROG)

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Background: Combined modality therapy has increasingly been used for patients with PCNSL but follow-up data beyond 5 years from prospective multicentre studies are few. This is an analysis of survival and neurotoxicity associated with a brief course of IV Methotrexate and cranial irradiation.

Materials and methods: Forty-six patients from 12 centres with biopsy-proven PCNSL were entered on a prospective Phase 2 study between 1991 and 1997. Patients had a median age of 58 (range 25-76) and were ECOG performance status 0-3. The treatment protocol consisted of Methotrexate 1gm /m2 given day 1 and day 8, followed by radiotherapy, initially to the whole brain to total dose of 45 Gy in 25 fractions, followed by a 5.4 Gy boost. Intrathecal therapy was only given in patients with positive CSF cytology. The minimum potential follow-up for these patients is now 5 years, with a median follow-up for survivors of 7 years.

Results: The Kaplan-Meier estimate of survival at 5 years is 37% ± 14 (95% CI) and progression-free survival 38% ± 16 (95% CI). No patient has relapsed more than 5 years following treatment. We were unable to demonstrate any influence of age or performance status on overall survival or progression-free survival. Age, however, had a major impact on the risk of neurotoxicity. Patients older than 60 years had a 5 year probability of neurotoxicity of 47% compared with 13% for younger patients ($p = 0.04$). The risk of neurotoxicity in older patients has continued to increase beyond 5 years. Ten of the 46 patients are alive, of whom 8 are without neurotoxicity.

Conclusions: A limited course of IV Methotrexate prior to radiotherapy appears to result in improved survival outcome in patients with primary CNS lymphoma. For patients younger than 60 these results may be inferior to more intensive combined modality regimens. Despite the limited course of IV Methotrexate and restriction of intrathecal therapy, the risk of neurotoxicity with this regimen is unacceptably high in older patients.