EDITORIAL

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Does Radiation Exposure from Abdominal Computed Tomography Increase Cancer Risk in Patients with Inflammatory Bowel Disease and Behçet Disease?

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See "Radiation Exposure from Abdominal Imaging Studies in Patients with Intestinal Behçet Disease" by Yoon Suk Jung, et al, on page 380, Vol. 8. No. 4, 2014

Although high dose ionizing radiation (>100 mSv) harms humans, particularly (but not exclusively) concerning cancer, the effect of lower radiation doses is less clear.[1] Low dose radiation exposure is of societal importance in relation to screening tests for cancer and occupational radiation exposure, as two examples. Inflammatory bowel disease (IBD) patients and cancer survivors undergo multiple radiological evaluations. Epidemiological data has implicated protracted exposure to a dose of 50 to 100 mSv with increased cancer risk.[1] An X-ray irradiation from disease-related diagnostic procedures has recently been questioned because of the potential cancer risk associated with the increasing use of computed tomography (CT). The effective dose from plain abdominal X-ray, for example, is around 0.7 mSV, and the effective dose from abdominal CT is equivalent to the effective dose of approximately 14 to 15 abdominal X-rays.[1,2] The effective radiation dose for abdominal CT is estimated to be 10 mSv and the dose for multidetector abdominal CT is 16.1 mSv.[2] The number of CT scans performed has been increasing recently. Concerns arise when CT is used without a proven clinical rationale, when alternative modalities like ultrasound and magnetic resonance imaging (MRI) could be used with equal efficacy, or when CT is repeated unnecessarily. Another important issue is the increasing use of CT scans as a screening procedure in asymptomatic patients. The benefit/risk balance for CT should be considered.

Chronic inflammation of the gastrointestinal (GI) tract in Crohn's disease and ulcerative colitis increases the risk of cancer and medications including azathiopurine, mercaptopurine, and infliximab may also increase the risk of lymphoma.[3-6] Patients with Crohn's disease have a higher cumulative radiation exposure from diagnostic imaging than patients with ulcerative colitis.[7-9] About 7% to 8% of Crohn's disease patients receive over 50 mSv every 5 to 8 years.[3] Diagnosis of Crohn's disease, surgery, prednisone use, first year of diagnosis and younger age are independent predictors of increased exposure in IBD patients.[4,9] Younger patients are at greater risk for developing radiation related cancer.[9]

Behçet disease patients are exposed to significantly harmful doses of diagnostic radiation, especially abdominal CT. Behçet disease patients may also have an increased risk of GI malignancies because of chronic inflammation and the use of immunosuppressive agents. Use of immunosuppressants, surgery, and hospitalization carry a greater risk of increased radiation exposure in patients with Behçet disease. The impact of an additional risk factor, radiation, on the development of malignancy is likely to be greater than in healthy workers exposed to an equivalent dose. Hence, physicians should be restrictive in exposing patients with Crohn's disease and Behçet disease to radiation-based investigations.

The first study to elucidate the cumulative radiation dose in patients with Behçet disease showed that a substantial proportion of intestinal Behçet disease patients were exposed to high doses of ionizing radiation from diagnostic tests, contrary to expectations.[10] Over a mean follow-up of 7.5 years, 28.1% of intestinal Behçet disease patients received cumulative doses exceeding 50 mSv, with the mean dose being 41.3 mSv. Sev-

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eral other studies regarding radiation exposure from diagnostic medical imaging in Crohn's disease reported a mean dose of 14.3 to 36.1 mSv and 7.0% to 23.7% of Crohn's disease patients had radation exposures exceeding 50 mSv.[3,5,7,8]

Exposure to higher levels of ionizing radiation from diagnostic studies in Behçet disease warrants further consideration. Clinicians should consider cumulative radiation exposure dose and order the radiologic examinations only at the time of predicting the clinical impact, for example, affecting the management.

The practical issue to be considered is how to minimize radiation exposure from repeated radiation-based diagnostic examinations in these patients. Two approaches can be conceived. The first involves alternative nonradiation-based diagnostic modalities, such as MRI-based investigations and videocapsule endoscopy.[11,12] Secondly, reduction of radiation exposure as much as possible is important by adjusting exposure for height and weight, using advanced technology (dual-source scanner) and techniques that reduce exposure.[11]

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

REFERENCES

1. Brenner DJ, Doll R, Goodhead DT, et al. Cancer risks attributable to low doses of ionizing radiation: assessing what we really know. Proc Natl Acad Sci U S A 2003;100:13761-13766.
2. Hall EJ, Brenner DJ. Cancer risks from diagnostic radiology. Br J Radiol 2008;81:362-378.
3. Newnham E, Hawkes E, Surender A, James SL, Gearry R, Gibson PR. Quantifying exposure to diagnostic medical radiation in patients with inflammatory bowel disease: are we contributing to malignancy? Aliment Pharmacol Ther 2007;26:1019-1024.
4. Levi Z, Fraser E, Krongrad R, et al. Factors associated with radiation exposure in patients with inflammatory bowel disease. Aliment Pharmacol Ther 2009;30:1128-1136.
5. Kroeker KI, Lam S, Birchall I, Fedorak RN. Patients with IBD are exposed to high levels of ionizing radiation through CT scan diagnostic imaging: a five-year study. J Clin Gastroenterol 2011;45:34-39.
6. Peloquin JM, Pardi DS, Sandborn WJ, et al. Diagnostic ionizing radiation exposure in a population-based cohort of patients with inflammatory bowel disease. Am J Gastroenterol 2008;103:2015-2022.
7. Jess T, Gamborg M, Matzen P, Munkholm P, Sørensen TI. Increased risk of intestinal cancer in Crohn's disease: a meta-analysis of population-based cohort studies. Am J Gastroenterol 2005;100:2724-2729.
8. Persson PG, Karlén P, Bernell O, et al. Crohn's disease and cancer: a population-based cohort study. Gastroenterology 1994;107:1675-1679.
9. Desmond AN, O'Regan K, Curran C, et al. Crohn's disease: factors associated with exposure to high levels of diagnostic radiation. Gut 2008;57:1524-1529.
10. Jung YS, Park DI, Moon CM, et al. Radiation exposure from abdominal imaging studies in patients with intestinal Behcet disease. Gut Liver 2014;8:380-387.
11. Fletcher JG, Fidler JL, Bruining DH, Huprich JE. New concepts in intestinal imaging for inflammatory bowel diseases. Gastroenterology 2011;140:1795-1806.
12. Fiorino G, Bonifacio C, Peyrin-Biroulet L, et al. Prospective comparison of computed tomography enterography and magnetic resonance enterography for assessment of disease activity and complications in ileocolonic Crohn's disease. Inflamm Bowel Dis 2011;17:1073-1080.