

Multiple Pyogenic Abscess of the Hybrid Mice on the Course of Radiation Experiment †

— Case Report —

Sung Heon Lee, M.D., Sei One Shin, M.D., Myung Se Kim, M.D.,
Won Hee Choi,* M.D. and Seung Hoon Kim** M.D.

Department of Therapeutic Radiology, Department of Pathology,
Department of General Surgery,** College of Medicine,
Yeung Nam University*

Even though the mechanism and the nature of radiation induced pneumonitis, esophagitis and gastroenteritis were detailed by many authors, complicated secondary infection is still serious problem, sometimes fatal, even today. We experience a case of multiple pyogenic abscess in subcutaneous tissue of the back and both kidneys which could not differentiate from multiple metastatic sarcoma grossly, and report with review of literatures, lab. findings.

Key Words: Multiple pyogenic abscess, Hybrid mice, Radiation

INTRODUCTION

Complicated secondary infection during and following radiation therapy are troublesome for clinical practice. We have some experience that considerable proportion of cause of death is pneumonitis or other inflammatory process, not malignancy itself, especially in debilitating patients. Authors observed multiple mass lesions in subcutaneous tissue of back and intraabdominal regions of treatment mice on the course of experiment, which were proved "multiple pyogenic abscess" pathologically. We report this case with peripheral blood findings, urinalysis, stool examination and pathological findings. Possible cause with supporting literature especially in immunological view is discussed.

CASE REPORT

On the process of radiation experiment, we observed 1 × 1 cm sized a soft mass in the subcutaneous tissue on left side of back in one mice.

(Apr. 12). Since the size of the mass was enlarged rapidly, I & D was performed on the 6th day (Apr. 18). Well circumscribed abscess sac with caseous material was investigated. Following smear and some necessary process for pathology, suture was done immediately. Although wound was healed without antibiotics, WBC count in peripheral blood was increased more (Apr. 26). Thin and thick smear of peripheral blood consulted to pathologist under the impression of leukemia, the report was "pyogenic inflammation" for caseous block, "leukemia could be ruled out" for peripheral blood smear. 2 week later (May 3), 1 × 1 cm sized hard mass in the left upper quadrant of abdomen was palpated. The size of the mass grew upper quadrant of abdomen was palpated. The size of the mass grew up quickly and bulging of the abdominal wall with decrement of general condition was developed. On the May 7th, morning, expired mouse was found.

Finding of peripheral blood, urinalysis, stool examination and exposed dose were tabulated (Table 1). Autopsy was performed. 2 × 2 cm sized yellowish white mass, involving over one half of left abdominal cavity, which was difficult to separate from stomach

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(upper), and spleen (left). Similar conditioned various sized small nodules were observed on the right side kidney (Fig. 2). Metastatic sarcoma was the impression, but pathological report was "Multiple abscess, pyogenic" (Fig. 3 & 4).

DISCUSSION

Pneumonitis, esophagitis, and enteritis during or

following radiation therapy were well established by many authors.¹⁻⁶⁾ Complicated radiation it is still one of the most difficult problem, in spite of massive development of antibiotics. Various mechanism and possible causes were proposed, but decreased host immune response due to cancer⁷⁾ or decreased immunity by irradiation,⁸⁻¹¹⁾ have discussed until present time.

Hoppe et al.¹¹⁾ demonstrated that decreased T cell and B cell count persisted for 3-4 years after completion of radiotherapy. Kohorn et al.⁸⁾ insisted that CMI (cell mediated immunity) was depressed

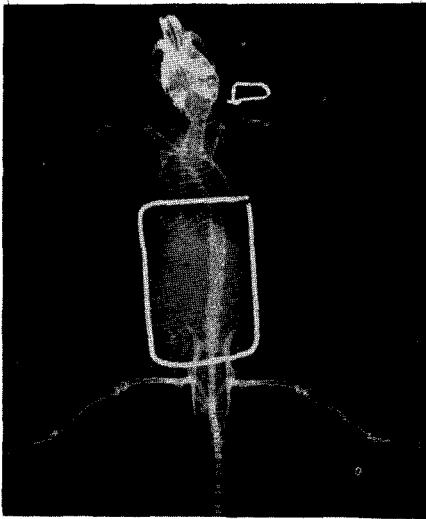


Fig. 1. Radiation field

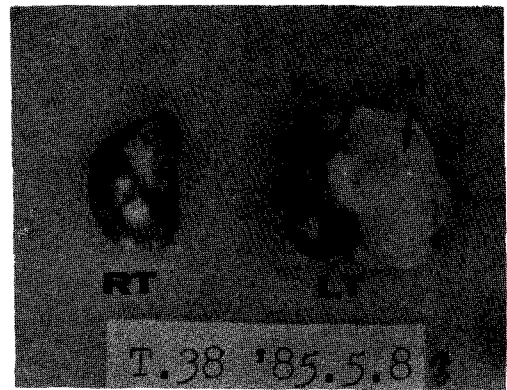


Fig. 2. Gross picture of the both kidney. Impression was sarcoma with multiple metastasis. RT: Rt. Kidney, LT: Lt. Kidney, K: Kidney M: Mass

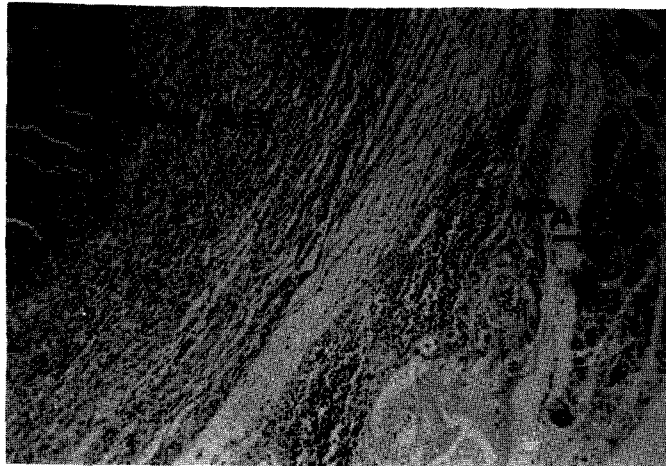


Fig. 3. Lt. Kidney: Diffuse heavily infiltration of polymorphonuclear leukocytes and lymphocytes with large necrotic foci. Infiltration is involving pancreas across the kidney capsule. (H&E, ×200) AB: Abscess. PA: Pancreas

significantly by radiation therapy after 7 days of treatment, remained low at 14 days, but recovered despite continuation of radiation therapy in stage I and II of ovarian cancer. He also insisted that depression was more marked among T cells, while the proportion of B cells remained unaffected.

McCredie et al.¹⁰⁾ showed that ADCC (antibody dependant cellular cytotoxicity) was same in male and female, was not affected by eating, smoking, or presence of infection, but was decreased in those over 65 years old, during pregnancy, in cachexia, or severe sepsis associated with non-malignant disease. He also insisted that radiotherapy caused a decreased K cell activity, maximal at 4 weeks, that persisted for 12 weeks with recovery after that time in those who did not return to normal in the patients who had persistent tumor or distant metastasis.

Different suggestion was proposed by Stevens et al.¹²⁾ He demonstrated that exposure of only ileum and jejunum by midline laparotomy of Holtzman male rats to 100-2000 rad resulted almost immediately and dose dependent activation of anti-tumor cellular immune mechanisms, as measured *in vitro* by the cytotoxicity of the animals' peripheral blood lymphoid cells. He also suggested that immunologic suppression by ionizing radiation presumably did not occur because only a small portion of the body was exposed.

Some difference between authors, cancers, experimental animals and exposure systems were suggested, but there is a trend which depression of

immunity by radiation could not be excluded completely, this may be the cause of frequent inflammatory process for cancer patients during or following radiation therapy. Unfortunately, we could not prove that whether the primary cause of death in this case was severe infection itself, or depression of the immunity or both. Furthermore, selection of inbred strains and well formulated diet, keeping of pyrogen free environment, and difficulty of T and B cell studies are still problems which we have to solve in near future.

CONCLUSION

Authors experienced one unusual case of multiple pyogenic abscess which cannot differentiate from metastatic sarcoma grossly. We reviewed about depression of immunity by irradiation with literatures. Need of pyrogen free colony should be considered for qualified experiment, and difficulty of immune study and selection of inbred mice should be solved in near future.

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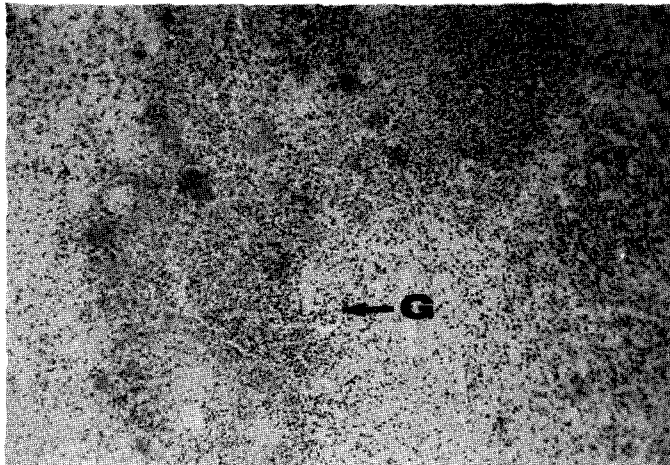


Fig. 4. Rt. Kidney: Diffuse infiltration of polymorphonuclear leukocyte and lymphocytes with multiple foci of necrosis throughout all kidney parenchyme especially on cortical area. Several intact glomeruli are seen on cortical area. (H&E, $\times 100$) G: Glomerulus

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=국문초록=

한국산 갑종취의 방사선 조사실험중에 발생한 다발성 농양 1예 보고

영남대학교 의과대학 치료방사선학교실

이 성 현 · 신 세 원 · 김 명 세

병 리 학 교 실

최 원 희

방사선 치료도중 혹은 치료후의 추적조사에서 이차감염에 의한 염증성 질환 및 방사선에 의해서 야기되는 소견과 합병된 이차 감염등은 흔히 경험하고 있는 일로서 때로는 이로 인해 치명적일 수 있게 된다.

저자들은 경북지방에서 사육된 정상 갑종취를 사용하여 방사선 조사실험을 하던 중 피하조직과 양측 신장부위에 압종으로 생각되는 다발성의 종괴를 발견하여 병리학적 검사를 의뢰하였던 바, 다발성 농양으로 판명되어 말초혈액소견, 소변검사, 대변검사 및 병리학적 소견과 함께 보고하는 바이다.

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