

Transcatheter Irradiation of Advanced Extrahepatic Biliary Tract Carcinoma

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Carcinoma of extrahepatic biliary tract is slow growing tumor but curative resection is rarely successful. Radiation therapy has been introduced for enhancing palliation and possible longterm survival.

We treated a case of advanced extrahepatic biliary tract carcinoma with high dose rate remote afterloading system through T-tube as a initial irradiation postoperatively. We hope that this treatment may affect not only enhancing palliation and better quality of life but also in local tumor control.

Key Words: Carcinoma of extrahepatic biliary tract. Transcatheter irradiation. High dose rate remote afterloading system

INTRODUCTION

Extrahepatic biliary tract tumor is usually slow growing and its distant metastasis rate is relatively low. But longterm survival after definitive resection remains still very low probably due to early tumor invasion into adjacent unresectable tissue¹⁾, and the exceedingly narrow tumor free margin obtained even by survative surgery.

Since local-regional failure is the main cause of treatment failure^{2,3)}, this suggest the need of more aggressive surgery and adjuvant postoperative irradiation for improving local control and survival. But external irradiation has the limit in maximum irradiation dose to achieve local control because of normal tissue tolerance so that localized high dose irradiation is necessary. Various technique such as intraoperative irradiation, interstitial implantation of radioactive sources and transcatheter irradiation are suggested as a concentrating high dose irradiation methods.

Authors used transcatheteric irradiation for treatment of advanced extrahepatic biliary tract carcinoma as a primary postoperative irradiation followed by external irradiation with conentional fraction. The technique and clinical advantages are discussed.

CASE REPORT

A 57 year old woman was admitted in general

surgery department of Yeung Nam University Hospital in September 1987 due to right upper quadrant pain, frequent vomiting and jaundice. She has suffered intermittent epigastric pain since 10 years ago and treated symptomatically.

In physical examination, skin was icteric and infant fist sized hard mass was palpable on right upper quadrant of abdomen, and her general condition was poor.

A small sized stone was noticed by ultrasound scanner. ERCP finding was extra-luminal compression of common bile duct. Abdominal CT showed 1 cm sized stone, dilated common bile duct and soft tissue mass in GB fossa around pancreatic head and paraaortic area.

Total bilirubin was 7.3 mg%, GOT 255 IU/L, GPT 313 IU/L, and alkaline phosphotase was 2626 IU/L.

On Oct. 9th, T-tube cholecystectomy and partial resection of tumor mass were performed because of bulky mass and wide invasion. The biopsy proved to be a adenosquamous carcinoma with extension into surrounding soft tissue beyond serosa. Maximum tumor area was marked with metal clips for post-op. irradiation. On Nov. 5th, transcatheter irradiation through T-tube was performed with dummy source under fluoroscopic guide as pretreatment confirmation and irradiation dose was calculated by Therac-2300 planning computer (Fig. 1~3). Next day, a single dose of 1,500 rad was delivered to 0.5 cm radius with high dose rate, remote afterloading system (RALS, Shimadzu) and patient tolerated well. 1 week later, simulation was

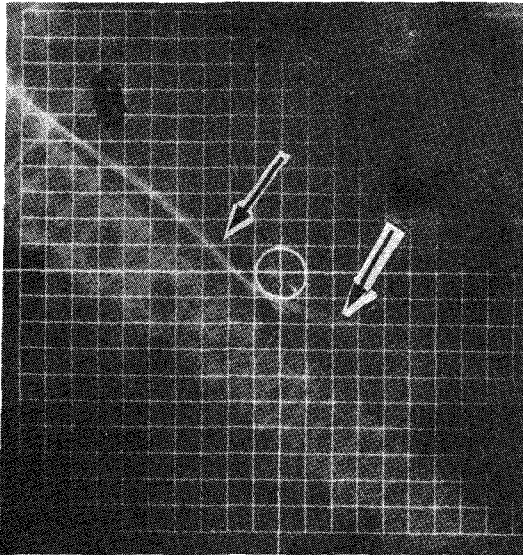


Fig. 1. Pretreatment evaluation with dummy source. Arrow indicate irradiation area.

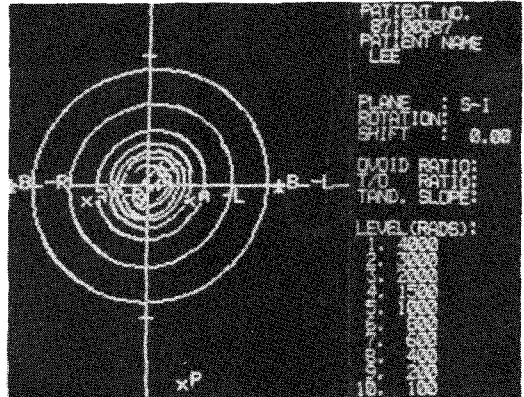


Fig. 3. Isodose curve in axial plane.

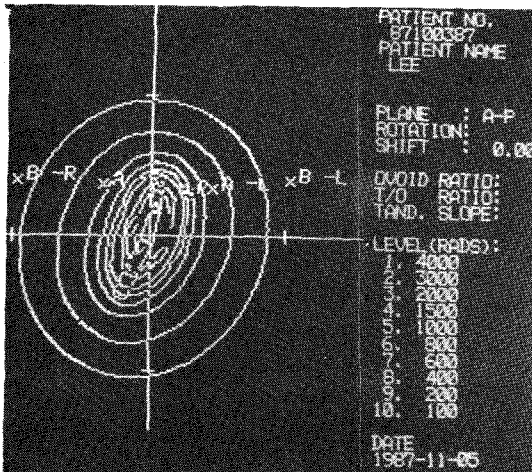


Fig. 2. Isodose curve in coronal plane.

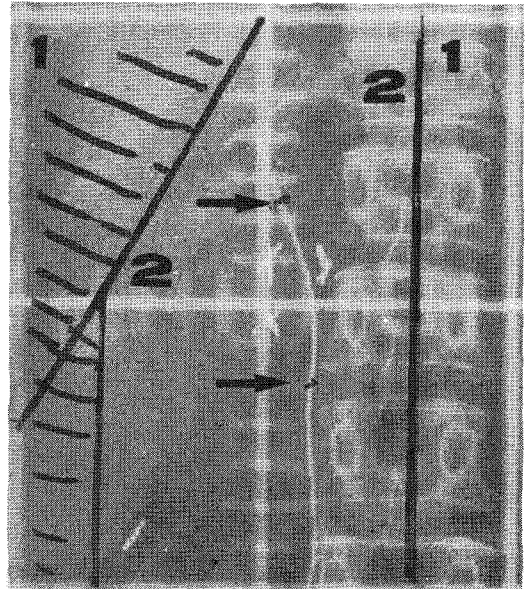


Fig. 4. Simulation film. Metal clips indicate the maximum tumor area and arrows show irradiating area. Note the changed field (# 2) after planning CT.

performed for external irradiation (Fig. 4) and correct field size were estimated and confirmed by planning CT. Total 2,000 rad tumor dose was planned with conventional fraction and patient finished all treatment without significant problems.

DISCUSSION

In spite of advances in early diagnosis and

surgical techniques, cure rate of extrhepatic biliary tract carcinoma is still very disappointing because of low resectability and high surgical mortality rate.

Reported resectability of biliary tract is 0-34%^{2,4)} and operative mortality is 10-30%^{4,5)}.

Various 5 year survival were reported by many authors from 5%²⁾ to 30%^{3,4)} in patients with successful resection. mean survival time of palliative operated patients were 4 months¹⁾-7.5 mon⁵⁾ but 1

month¹⁾-2.5 month⁵⁾ in patients with non-resectable tumors.

Kopelson, et al²⁾ Pilepich and Lambert³⁾ analyzed the spreading mode of extrahepatic biliary tract cancer and reported that main cause of failure was local-regional which was 81% of failure group after even curative resection. Such a high local-regional failure suggest the need of aggressive adjuvant therapy postoperatively in all patients.

Various techniques and the advantages of external beam irradiation were introduced by several authors as an adjuvant therapy but it has some limitation due to unwanted internal damage and in-applicability of high dose^{1~3), 6, 7)}. Intraoperative^{8~12)}, interstitial^{10, 13)} and transcatheter irradiation^{6, 10)} were proposed as localized high dose irradiation to overcome the disadvantages of external irradiation.

Transcatheter irradiation to overcome the disadvantages of external irradiation.

Transcatheter irradiation can deliver highly concentrated dose through PTC (percutaneous transhepatic cholangiography) catheter or T-tube by using radionuclides such as ¹⁹²Ir, ¹²³I, cobalt, cesium or radium sources. This technique has many advantages such as delivering localized high dose without morbidity of the surrounding normal tissue and easy practice without anesthesia or operative maneuvering etc. This can be used as initiating local control or supplementary boost therapy, 2-4 week after completion of external beam irradiation.

Reported dose are 5,000 rad by transcatheteric irradiation followed by 4,600 rad external irradiation⁶⁾. Herskovic et al.⁵⁾ confirmed the disappearance of the lesion by angiographic studies and he advocated that these combination technique may enhance palliation and possibly affect longterm survival.

Animal and clinical study about complication were published^{1, 8, 9, 11)}. Most authors reported no significant complication upto 2,000 rad single irradiation. We irradiated with cobalt source (Shimadzu, RALS 2.91 Ci) through T-tube which was already fixed by surgeon without any problem. Single 1,500 rad at 0.5 cm radius was given and planned 2,000 rad external beam irradiation due to poor patient condition. We think that this dose of supplementary external beam irradiation is lower than necessity

because Todoroki et al.¹¹⁾ observed viable tumor cell in intima and media of the artery after 2,500-3,000 rad single dose irradiation.

Since this is our first experience, we think that we need more studies and thorough evaluation of advantages and disadvantages of this technique. But we hope that this technique may enhance not only the palliative effect but also local control and longterm survival.

REFERENCES

1. Green N, Mikkelsen WP, kernen JA: Cancer of the common hepatic bile duct. Palliative radiotherapy. *Radiology* 109:687-689, 1973
2. Kopelson G, Galdabimi J, Warshaw AL, et al: patterns of failure after curative surgery for extrahepatic biliary tract carcinoma: Implication for adjuvant therapy. *Int J Radiat Oncol Biol Phys* 7:413-417, 1981
3. Pilepich MV, Lambert PM: Radiotherapy of carcinoma of the extrahepatic biliary system. *Radiology* 127:767-770, 1978
4. Charnsangave JC, Chuang VP, Wallace S, et al: Work in progress; Transcatheter management of primary carcinoma of the liver. *Radiology* 147:51-55, 1983
5. Evander A, Fredlund P, Hoevels DJ, et al: Evaluation of aggressive surgery for carcinoma of the extrahepatic bile ducts. *Ann surg* 46:23-29, 1980
6. Herskovic A, Heaston D, Engler MJ, et al: Irradiation of biliary carcinoma. *Radiology* 139:219-222, 1981
7. Suit HD, Todoroki T: Rationale for combining surgery and radiation therapy. *Cancer* 55:2246-2249, 1985
8. Iwasaki Y, Ohto M, Todoroki T, et al: Treatment of the biliary system. *Surg Gyn Obst* 144:219-224, 1977
9. Cady B, Macdonald JS, Gunderson LL: Cancer of the hepatobiliary system. *Cancer Philadelphia, JB Lippincott*. 1985. pp 762-764
10. Todoroki T, Iwasaki Y, Okamura T, et al: Intraoperative radiotherapy for advanced carcinoma of the biliary system. *Cancer* 46:2179-2184, 1980
11. Tepper JE, Gunderson LL, Orlow E, et al: Complication of intraoperative irradiation therapy. *Int J Radiat Oncol Biol Phy* 10:1831-1839, 1984
12. Cody HS, Turnbull AD, Fortner JG, et al: The continuing challenge of retroperitoneal sarcoma *Cancer* 47:2147-2152, 1981

== 국문초록 ==

진행된 담도암의 경관조사

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담도암은 서서히 자라며 원격전이 늦은데 비하여 완전절제가 어렵고 수술후 재발율이 높아 생존율은 매우 낮다. 많은 예에서 국소치료의 실패가 치료실패의 요인으로 밝혀짐에 따라 술후 방사선 치료의 중요성이 인정되어 왔다. 외부방사선치료 만으로는 충분한 선량을 조사할 수 없으므로 국소적인 고선량치료법으로서 술중방사선치료, 간질방사선치료(interstitial irradiation), 경관방사선치료(transcatheter irradiation) 등이 사용되고 있으나 경관방사선치료의 보고는 드물다.

영남대학병원 치료방사선과에서는 진행된 담도암 1예에서 암 종괴의 부분절제 후 삽입된 T-자관을 통하여 고선량 방사선 치료를 실시하였기에 문헌고찰과 함께 보고하는 바이다.

