Some Considerations on Infusion Therapy of the Tumor of the Head and Neck Using ^{131}I or ^{203}Hg Labelled Compounds

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Some method of infusion therapy on cancer of the head and neck were investigated using radioisotopes.

1. Catheter localization

The catheter was placed in a. carotis externa via a. temporalis superficialis retrograde. The tip of the catheter was situated at the junction of nourishing artery of tumor in a. carotis externa, then anticancer drug was infused through the catheter into the region of tumor directly.

Before that, to ascertain whether the tip is situated satisfactorily or not, dyes or contrast media were infused during intubation operation. For the same purpose it was reinvestigated using scintigraphic method after infusion of ^{131}I-MAA before the infusion of anticancer drugs. In one of these investigation, in spite of afirmation of the position of the tip during operation, ^{131}I-MAA distributed in unexpected region. In the case of dye, various conditions just as infusion pressure come into the problem, therefore this postoperative radioisotope technique is valuable to determine the position of the tip appropriately.

2. The duration time of infusion.

Using a four channel scintillation ratemeter, the change of radioactivities on the parts of tumor, heart, femoral artery and infusion pump were recorded during infusion of radioisotope labelled compounds. According these investigations, the following conclusions were considered:-

$$C_{(t)}=\frac{D}{\lambda T W}(1-e^{-\lambda t})+\frac{D}{\lambda' T W}(1-e^{-\lambda' t})$$

$\because t \leqq T$

$$C_{(t)}=\frac{D}{\lambda T W}(1-e^{-\lambda T})e^{-\lambda(t-T)}$$

$$+\frac{D}{\lambda' T w}(1-e^{-\lambda' T})e^{-\lambda'(t-T)} \quad \because t>T$$

here c(t): concentration of drugs in tumor at time t.

W and w: the weight of total body and tumor:

D: dose of drug.

T: duration time of infusion

and : decay constant in whole body and in tumor.

By these equation, if the concentration in tumor should be at least the double of that by venous injection, the most effective infusion duration time is one or two hours.

3. Examination of drugs.

Various type of radioisotopes were infused in this investigation, and it was proved using linear scanning method that ^{131}I-RISHA is gathered in heart, ^{203}Hg-Merphrin in liver and kidneys and ^{197}Hg-Neohydrin in kidneys but ^{131}I-MAA remains in tumor. Daily changes of the concentration of radioisotopes in tumor were also studied by the same method. Biological half life of neohydrin in tumor is about one hour, that of merphyrin about ten hours and that of ^{131}I-MAA is 2.2 days in average. But the fact that in some cases the lalf life was longer than four days and in other cases were about one day, may acount its large variation of the sizes of aggregates.