

Complications and Management of Hepatic Arterial Infusion Chemotherapy for Liver Metastasis

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Complications and management of hepatic arterial infusion chemotherapy for 79 patients with liver metastasis were studied. Complications were observed in 20 cases (25.3%), who included 8 cases (88.9%) of laparotomy group and 12 cases (17.6%) of left subclavian group. In laparotomy group, they were 5 cases of system occlusion, 2 cases of catheter tip dislocation and catheter reinsertion through the left subclavian artery was performed in 4 cases. In left subclavian group, they were 4 cases of system occlusion, 3 cases of catheter tip dislocation, 2 cases of hepatic arterial occlusion and hepatic arterial infusion chemotherapy was continued with catheter reinsertion in 8 of the 9 cases. It was considered that positive anti-complication measures including catheter reinsertion would contribute to the improvement of therapeutic results.

Introduction

The progress and development of an infusional port and catheter with a knot (Anthrone tube) was a great step forward in the hepatic arterial infusion chemotherapy (HAIC) for liver metastasis to avoid the reduction of QOL. The favorable effect of HAIC has been reported by using infusional port and catheter with a knot. On the other hand, a high rate of complications on the system or hepatic artery has led to discontinuance of HAIC. We have studied the complications and their managements on HAIC for metastatic liver tumors.

Subjects

Seventy-nine patients with liver metastasis who had been treated by HAIC between April 1991 and March 1993 were selected for this study. The subjects consisted of 44 patients with colorectal cancer, 16 with gastric cancer, 6 with pancreas cancer, 3 with breast cancer, 3 with lung cancer and 7 with the other cancers. The route of catheter insertion was laparotomy in 9 patients, left subclavian method in 68 and femoral method in 2.

Results

Complications were observed in 8/9 cases (88.9%) of the laparotomy group. They were 5 cases of system occlusion, 2 cases of catheter tip dislocation and 1 case of gastric ulcer. On the other hand, complications were observed in 12/68 cases (17.6%) of the left subclavian artery method group. There were 4 cases of system occlusion, 3 cases of catheter tip dislocation, 2 cases of hepatic artery occlusion, 2 cases of cerebral infarction and 1 case of gastric ulcer. The complications occurred early in the laparotomy group and those in the left subclavian artery method group, occurring within 6 months. Hepatic artery occlusion occurred in no less than 1 year (Table 1).

Table 1. Complications of hepatic arterial infusion chemotherapy by infusional port

Complication	Laparotomy [n = 9]	Left subclavian method [n = 68]
system occlusion	5 (2.6 ± 2.1)*	4 (6.3 ± 3.5)
catheter dislocation	2 (0.75 ± 0.25)	3 (5.2 ± 2.3)
occlusion of hepatic artery		2 (13.7 ± 2.7)
cerebral infarction		2 (6.5 ± 0.5)
gastric ulcer	1 (12.0)	1 (7.0)
	8/9 [88.9%]	12/68 [17.6%]

*: (mean ± SD months) complication free interval

Arterial infusion port indwelling was performed in the 9 cases by the laparotomy method. HAIC was continued with catheter reinsertion thorough the left subclavian artery in 3 of the 5 system occlusion cases and 1 of the 2 catheter tip dislocation cases. Right gastric artery embolization with a metallic coil allowed continued HAIC performance in the 1 case of gastric ulcer (Table 2).

Complications observed in the left subclavian artery method group included 4 cases of system occlusion that occurred in 1.4-11.0 (mean:6.4) months. The system occlusion in case 2 was considered attributable to catheter occlusion, and the occlusion was removed with guide wire manipulation alone in this case. Catheter reinsertion

Table 2. Effects and Complications of arterial infusion chemotherapy by laparotomy

Case	Age	Sex	Complication	Periods	Management	Effects	Prognosis
1	58	M	system occlusion	4M	reinsertion	PD	8M death
2	55	F	dislocation	1M			15M death
3	53	F	system occlusion	40D	reinsertion	PD	7M death
4	74	F	system occlusion	14D			23M alive
5	65	M	system occlusion	6M			22M alive
6	77	M	gastric ulcer	12M	RGA embolus	PR	19M alive
7	54	M	system occlusion	40D	reinsertion	PR	6M alive
8	57	M	dislocation	12D	reinsertion	PR	18M alive
9	67	M	(-)				15M alive

through the left subclavian artery or femoral artery was performed in the other cases. As for the prognosis, case 3 died of lung metastasis at month 9 and 3 other cases have survived for 12-17 months (Table 3).

Table 3. Complications of arterial infusion chemotherapy via left subclavian artery I (system occlusion)

Case	Age	Sex	Periods	Management	Prognosis
1	72	M	5.7M	reinsertion	16M alive
2	81	M	11.0M	recanalization using guide wire	17M alive
3	53	M	7.4M	reinsertion	9M death*
4	68	M	1.4M	reinsertion	12M alive

*: lung metastasis

Catheter tip dislocation complication was found in 3 cases of this group in 2.0-7.3 (mean:5.2) months. The catheter tip was found inserted deep into the splenic artery, aorta and right hepatic artery. Catheter reinsertion was performed in Cases 5 and 6, while the left subclavian wound was incised to withdraw the catheter and have it indwelled in the correct position in Case 7. As for the prognosis, Case 7 died of lung metastasis at month 4 and the other cases have been surviving for 12-14 months (Table 4).

Table 4. Complications of arterial infusion chemotherapy via left subclavian artery II (dislocation)

Case	Age	Sex	Periods	Catheter tip Position	Management	Prognosis
5	71	F	6.3M	splenic artery	reinsertion	12M death
6	71	M	7.3M	aorta	reinsertion	14M alive
7	53	M	2.0M	right hepatic artery	reinsertion	4M death

*: lung metastasis

Table 5. Complications of arterial infusion chemotherapy via left subclavian artery III (hepatic arterial occlusion and cerebral infarction)

Case	Age	Sex	Periods	Management	Prognosis
hepatic arterial occlusion					
8	65	F	16.3M	reinsertion	20M alive
9	57	M	11.0M	systemic chemotherapy	18M alive
cerebral infarction					
10	58	F	6.0M	anticoagulant therapy	9M alive
11	72	M	11.0M	anticoagulant therapy	16M alive

Hepatic artery occlusion occurred in 2 cases of this group in 11.0-16.3 months. Catheter reinsertion beyond the occluded region was performed using a guide wire in Case 8. Lung metastasis intensified in Case 9 and hepatic arterial infusion was discontinued and switched to systemic chemotherapy in this case. Cerebral infarction occurred in 2 cases of this group in 6.0-11.0 months. Both cases had infarction in the cerebellum and showed Wallenberg symptoms. The symptoms were improved with anticoagulant therapy in both cases (Table 5).

Discussion

The therapeutic results of arterial infusion chemotherapy for metastatic liver cancer have improved drastically with the permeation of subcutaneous implantation type arterial infusion port and antithrombotic catheter procedures. Arai *et al.* reported 73% direct effect of weekly high dose 5FU hepatic arterial infusion obtained in liver metastasis from colorectal cancers¹⁾ and 76.5% response rate obtained with FAM arterial infusion in liver metastasis from gastric cancers.²⁾ On the other hand, however, cases of inevitable discontinuation of arterial infusion therapy were experienced because of the complications particular to arterial infusion such as system occlusion and catheter tip dislo-

cation.

In the present clinical study, complications were observed in 20 (25.3%) of the 79 cases that received arterial infusion port insertion. Analysis of complications by the insertion routes revealed a high complication incidence of 8/9 cases in the laparotomy group. This was considered attributable to that most of the early cases received laparotomy resulting in unfamiliarity with system insertion and management. Other factors considered attributable were the use of silicon catheters in the system and consequent anticoagulability problems. On the other hand, complications occurred in 12/68 cases (17.6%) of the left subclavian artery method group. The incidence was slightly lower than the 24% reported by Kasuya *et al.*³⁾ Therefore, the complication in the left subclavian artery method group were examined in detail. System occlusion complications occurred in 4 cases in an average of 6.3 months. Catheter reinsertion through the left subclavian artery or femoral artery was possible in all of these cases. Catheter tip dislocation occurred in 3 cases in an average of 5.2 months. The catheter tip dislocation sites ranged from the splenic artery to the aorta and right hepatic artery periphery. Different from system occlusion, abnormality is rarely noticed during drug infusion in the case of catheter tip dislocation. Therefore, regular checking of catheter position and determination of therapeutic effects were considered imperative to early detection. Hepatic artery occlusion complications were observed in 2 cases. These were on long-term arterial infusion therapy for an average of 13.7 months. Hepatic artery occlusion is considered to be induced by causes such as chemical injury of the endangium

due to drug infusion and physical damage of the endangium due to catheterization. Once hepatic artery occlusion occurs, there is no effective measure for its correction. Therefore, this was considered the utmost problem with the performance of long-term arterial infusion therapy. Arai *et al* reported a decrease in the incidence of hepatic artery occlusion obtained with CHA or SPA coil method in place of the conventional standard catheter indwelling method. These methods including catheter indwelling method were considered to be subjects for future research.

The success rates reported on arterial infusion therapy for metastatic liver cancer vary widely from 10%-75%. This is considered largely due to technical differences. Moreover, since the incidence of complications particular to arterial infusion rises in long-term arterial infusion cases, it was considered that positive anti-complication measures including catheter reinsertion would contribute to the improvement of therapeutic results.

References

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