

# : PIPS(Percutaneously Implantable Port System)

1

2

: (intra-arterial chemotherapy)

PIPS

: PIPS(PIPS-200, William Cook Europe, Denmark)

27 , 27

(Port-A-Cath, 5.8F, SIMS Deltec, U.S.A.)

19 , 21

(percutaneous approach)

18 가

16

494

163

12

431

150

PIPS

23

:

PIPS

(n=8),

(n=7),

(n=5),

(n=2),

(n=1),

(n=1),

(n=1),

(n=1),

(n=1)

, (n=4),

(n=6),

(n=6),

(n=3),

(n=1),

(n=1)

. PIPS

27 7 (25.9%)

3

4 (14.8%)

21 4 (18.2%)

, 4

: PIPS

가 가

(5.6).

가 가 ,  
가

(1-3). 1986

가

(4)

(7,8)

5F

가

가 가

가

(9-11). 1995 Strecker  
ly implan-table port system(PIPS)

percutaneous-  
가 가  
가

1

2

1998 11 4

1999 1 25

(12).

가 가 PIPS

1996 11 1997 2 PIPS(PIPS-200, Wil-liam Cook Europe, Denmark)

27 , 27 1997 2 1997 10

(Port-A-Cath, 5.8F, SIMS Deltec, U.S.A.)

19 , 21

PIPS 가 PIPS

가 , PIPS

가 1 44 , 48

33 77 ( 54.7 ) , 가 35

가 9

16 ,

2 , 2 ,

1 .

8 , 5 , 2 , 1

PIPS

PIPS 23 494 163 ,

12 431 150 .

(Technique)

PIPS

PIPS 4F

28F

(holding handle)

(oblique plane)

가 (Fig.1).

PIPS Seldinger

4F

(sheath)

가

가 (side hole)

.025 ~ (Terumo Glidewire, Tokyo, Japan)

(Fig. 3A).

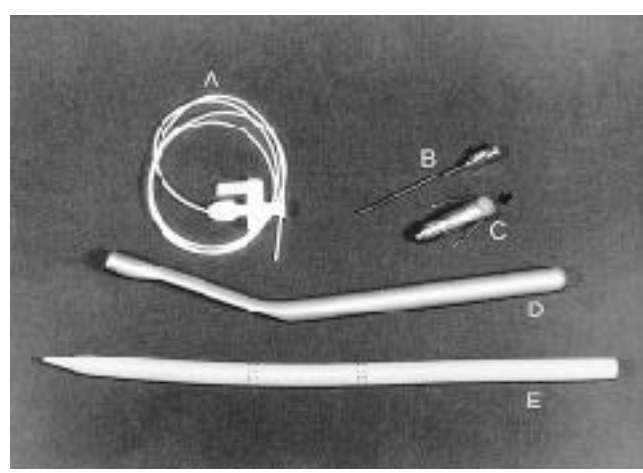


Fig. 1. Photograph of the PIPS which is composed of 4F polyurethane port catheter(A), non-coring needle(B), port chamber(C), holding handle(D), and 28F dilator(E). Silicone membrane(arrow) is designed on the end of port chamber obliquely.

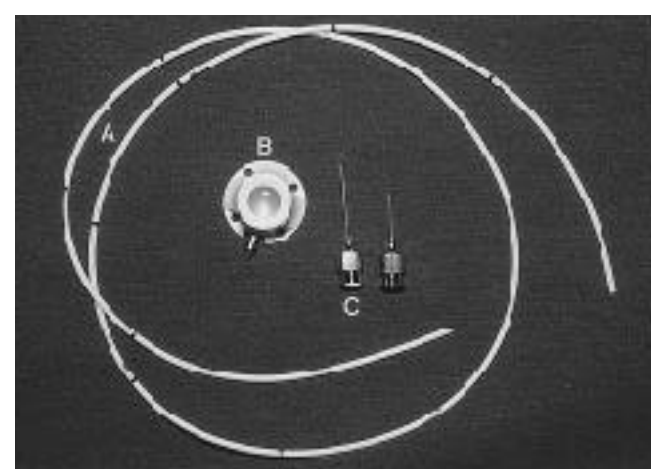


Fig. 2. Photograph of the pediatric venous port system which is composed of 5.8F polyurethane port catheter(A), port chamber(B), and non-coring needle(C).

1cm 가  
가 0.5cm (caudally) 28F

3-4cm 가  
가 0.5cm

.035 "

(Terumo Glidewire, Tokyo, Japan)

5.5cm

(Fig. 4A).

(non-coring needle)

(heparin 5,000u+nor-

mal saline 9cc)

(Fig. 4B).

(Fig. 3B).

가

48

PIPS

8

7

5

2

Port-A-Cath

Port-A-Cath

1

6

3

4

6

5.8F

(Fig. 2).

Seldinger

PIPS

가

8

7

PIPS

6

2

2

2



A



B

Fig. 3. A. Radiograph after port catheter(4F) insertion shows that the catheter tip is located in the right hepatic artery(arrow). Left hepatic artery is embolized by coils(open arrow).

B. Radiograph shows that port chamber is buried in the subcutaneous tissue at the infrainguinal region.



A



B

Fig. 4. A. Radiograph after port catheter(5.8F) insertion shows that the catheter tip is located in the proper hepatic artery(arrow). Gastroduodenal artery is embolized by coils(open arrow).  
B. Radiograph shows that port chamber is buried in the subcutaneous tissue at the infrainguinal region.

1 . PIPS 2 4 (14.8%) 3  
(stenosis) 1  
가 4F .025 " PIPS 2 1 ,  
(radio-opacity) 가 , 4 (18.2%)  
5.8F .035 " (thrombosis) 2 ,  
(hematoma) 2  
PIPS -S (rectosigmoid colon)  
PIPS 28F 2 가 2  
가 PIPS 가 2  
가 PIPS 가 가  
가 가 가 가  
가 3 , 1 (6,7,13).  
가 가 PIPS 가  
PIPS 가 PIPS

PIPS 27 7 (25.9%)

PIPS 4F

3 4 (14.8%)

PIPS 1

21 3 (13.6%) , 3

가

PIPS 3 (intimal hyperplasia)

PIPS

3 2

, 1

(13).

가 PIPS 2

가

가

가

가 PIPS

가

(13).

(14,15).

PIPS

가 4F

.025 "

가

가

가 5.8F

가

68 .035 "

(superior mesenteric artery)

PIPS

가

1

7

-S

5.8F

1. Watkins E, Khazei AM, Nahra KS. Surgical basis for arterial infusion chemotherapy of disseminated carcinoma of the liver. *Surg Gynec Obstet* 1970 ; 130 : 581-605

2. Fortuny IE, Theologides A, Kennedy BJ. Hepatic arterial infusion

- of liver metastases from colon cancer: comparison of mitomycin C and 5-fluorouracil *Cancer chemother. Rep* 1975 ; 59 : 401-404
3. Ansfield FJ, Ramirez G, Davis HL et al. Further clinical studies with intrahepatic arterial infusion with 5-fluorouracil. *Cancer* 1975 ; 36 : 2413-2417
  4. Grage TB, Vassilopoulos PP, Shingleton WW et al. Results of a prospective randomized study of hepatic artery infusion with 5-fluorouracil versus intravenous 5-fluorouracil in patients with hepatic metastasis from colorectal cancer : a central oncology group study. *Surgery* 1986 ; 550-555
  5. Hohn DC, Stagg RJ, Friedman MA et al. A randomized trial of continuous intravenous versus intraarterial floxuridine in patients with colorectal cancer metastatic to the liver : the northern california oncology group trial. *J Clin Oncol* 1989 ; 7 : 1646-1654
  6. Chang HT, Mok KT, Tzeng WS. Induction intraarterial chemotherapy for T4 breast cancer through an implantable port-catheter system. *Am J Clin Oncol* 1997 ; 20 : 493-499
  7. Cho KJ, Andrew JC, Williams DM, Doenz F, Guy GE. Hepatic arterial chemotherapy : role of angiography. *Radiology* 1989 ; 173 : 783-791
  8. Yoshikawa M, Ebara M, Nakano T, Minoyama A, Nobuyuki S, Ohto M. Percutaneous transaxillary catheter insertion for hepatic artery infusion chemotherapy. *AJR* 1992 ; 158 : 885-886
  9. Wacker FK, Boese-Landgraf J, Wagner A, Albrecht D, Wolf KJ, Flobbe F. Minimally invasive catheter implantation for regional chemotherapy of the liver : A new percutaneous transsubclavian approach. *Cardiovasc Intervent Radiol* 1997 ; 20 : 128-132
  10. Oi H, Kishimoto H, Matsushita M, Hori M, Nakamura H. Percutaneous implantation of hepatic artery infusion reservoir by sonographically guided left subclavian artery puncture. *AJR* 1996 ; 166 : 821-822
  11. Niederhuber JE, Ensminger W, Gyves J, Thrall J, Walker S, Cozzi E. Regional chemotherapy of colorectal cancer metastatic to the liver. *Cancer* 1984 ; 53 : 1336-1343
  12. Strecker EP, Ostheim-Dzerowycz W. Newly developed non-surgically implantable catheter port system to treat patients with advanced peripheral artery disease : first clinical results with 15 patients. Abstract No. 295 CIRSE 1995. *Cardiovasc Intervent Radiol* 1995 ; 18 : Suppl1, S115
  13. 荒井保明 . 理論と現状 . In 日本血管造影 . Interventional Radiology 研究會. 特集肝臓に対する動注化学塞栓療法 IVR 1993 ; 8 : 38-41
  14. 稲葉吉隆, 荒井保明, 曾根康博 . 新しい技術-カテーテルの固定・側副血行路へのアプローチ. In 日本血管造影 . Interventional Radiology 研究會. 特集肝臓に対する動注化学塞栓療法 IVR 1993 ; 8 : 61-66
  15. 田中 直, 服部孝雄, 小野元嗣, 中野英明, 林 仁庸, 村林 紘二. カテーテル・リザーバー挿入の基本的な手技(下腹壁動脈経由). In 日本血管造影. In Interventional Radiology 研究會. 特集 肝臓に対する動注化学塞栓療法 IVR 1993 ; 8 : 51-55
  16. Pullyblank AM, Tanner AG, Carey PD, Guillou PJ, Pearce SZ, Monson JRT. Comparison between peripherally implanted ports and externally sited catheters for long-term venous access. *Ann R Surg Engl* 1994 ; 76 : 33-38
  17. Morris SL, Jaques PF, Mauro MA. Radiology-assisted placement of implantable subcutaneous infusion ports for long-term venous access. *Radiology* 1992 ; 184 : 149-151

## **Intra-arterial Port Implantation for Intra-arterial Chemotherapy : Comparison between PIPS(Percutaneously Implantable Port System) and Port System<sup>1</sup>**

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**Purpose :** To compare the techniques and complications of intra-arterial port implantation for intra-arterial chemotherapy between PIPS and the port system.

**Materials and Methods :** For intra-arterial port implantation, 27 cases in 27 patients were retrospectively evaluated using PIPS(PIPS-200, William Cook Europe, Denmark) while for 21 cases in 19 patients a pediatric venous port system(Port-A-Cath, 5.8F, SIMS Deltec, U.S.A.) was used. All intra-arterial port implantation was performed percutaneously in an angiographic ward. Hepatocellular carcinoma was diagnosed in 18 patients and hepatic metastasis in 16. Peripheral cholangiocarcinoma, and pancreatic gastric, ovarian, renal cell and colon carcinoma were included. We compared the techniques and complications between PIPS and the port system. The follow up period ranged from 23 to 494(mean, 163) days in PIPS and from 12 to 431(mean, 150) days in the port system.

**Results :** In all cases, intra-arterial port implantations were technically successful. Port catheter tips were located in the common hepatic artery(n= 8), proper hepatic artery(n= 7), right hepatic artery(n= 5), gastroduodenal artery(n= 2), left hepatic artery(n= 1), pancreaticoduodenal artery(n= 1), inferior mesenteric artery(n= 1), lumbar artery(n= 1), and renal artery(n= 1) in PIPS, and in the proper hepatic artery(n= 6), gastroduodenal artery(n= 6), common hepatic artery(n= 3), right hepatic artery(n= 4), inferior mesenteric artery(n= 1), and internal iliac artery(n= 1) in the port system. Port chambers were buried in infrainguinal subcutaneous tissue. Using PIPS, complications developed in seven cases(25.9%) and of these, four (57.1%) were catheter or chamber related. In the port system, catheter or chamber related complications developed in four cases(19.0%).

**Conclusion :** Because PIPS and the port system have relative merits and demerits, successful intra-arterial port implantation is possible if equipment is properly selected.

**Index words :** Arteries, hepatic

Catheters and catheterization, technology

Chemotherapeutic infusion

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