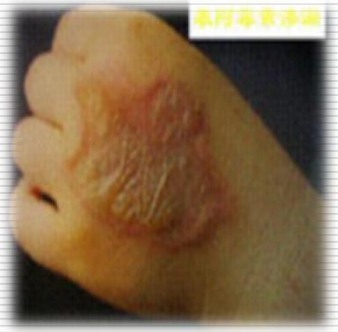
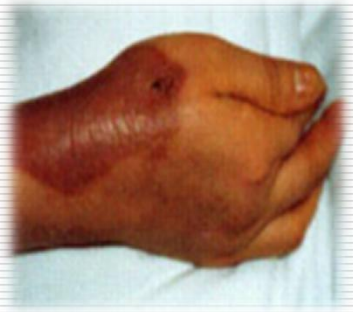
医护合作下上臂植入输液港临床应用

上海交通大学医学院附属仁济医院　仇晓霞

相 关 概 念

静脉置管：
指为了进行输液疗法而将导管直接插入静脉





中心静脉置管：
为了向静脉内连续或间断输液而将导管置入中心静脉
导管末端位于上腔静脉

静脉输液工具的发展

头皮针

套管留置针

中心静脉导管（CVC）

经外周中心静脉导管（PICC）

输液港（port）

血管通路装置计划向制度和流程指南转变

- 首要目标：选择伤害最小的血管通路装置，在最可能达到治疗目标的情况下，尽可能少地更换和降低并发症发生率

  - 复杂的决策
  - 需要评判性思维和分析
  - 不能仅局限于单一因素，比如药物或发疱剂的类别或刺激性药物
  - 影响临床预后，患者满意度

INS 2016 新标准 新实践

Vascular Access Device Planning血管通路工具计划

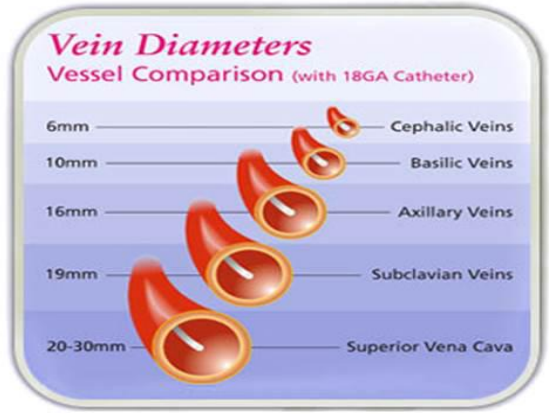
标准：

26.1 应该根据治疗处方或治疗方案、预期治疗的时间、血管特征、患者年龄、并存疾病、输液治疗史、对血管通路装置位置的偏好和可用于设备护理的能力和资源，选择适宜患者血管通路需要的血管通路装置 (VAD)的类型（外周或者中心）。

26.2 **选择最适当的血管通路装置是跨学科团队、患者和患者照护者之间的协作过程。**

26.3 应该选择外径最小、管腔数量最少的血管通路装置，这将是满足处方治疗的创伤性最小的装置。

26.4 当计划血管通路时应考虑外周静脉保护。



2016版INS指南

“In this whirlwind of change, clinicians are expected to not only master the insertion, care, and management of vascular access devices but to also inform clinical decisions regarding device choice and venous access route.”

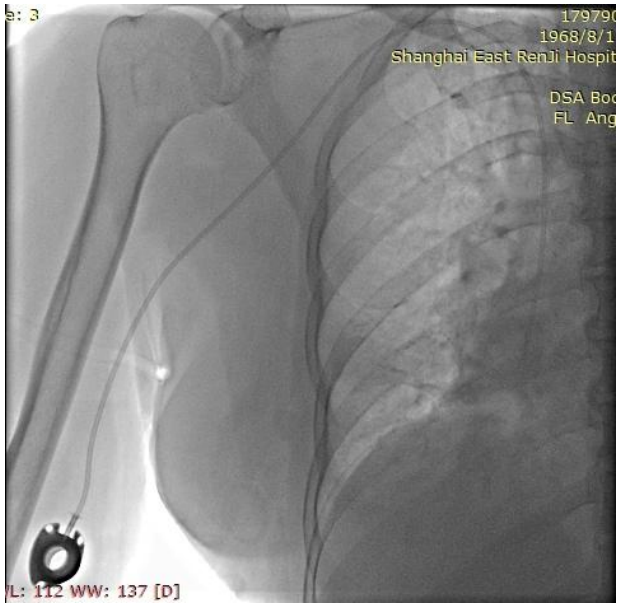
在血管通路领域飞速发展时代，**临床医护人员**不仅要掌握血管通路工具的置入，维护和管理技术，而且对血管通路路径和工具选择的临床决策信息要给予通告。

Chopra V, Flanders SA, Saint S, et al. The Michigan appropriateness guide for intravenous catheters (MAGIC): results from an international panel using the RAND/UCLA appropriateness method. Ann Intern Med. 2015;163(suppl 6):S1-S39.

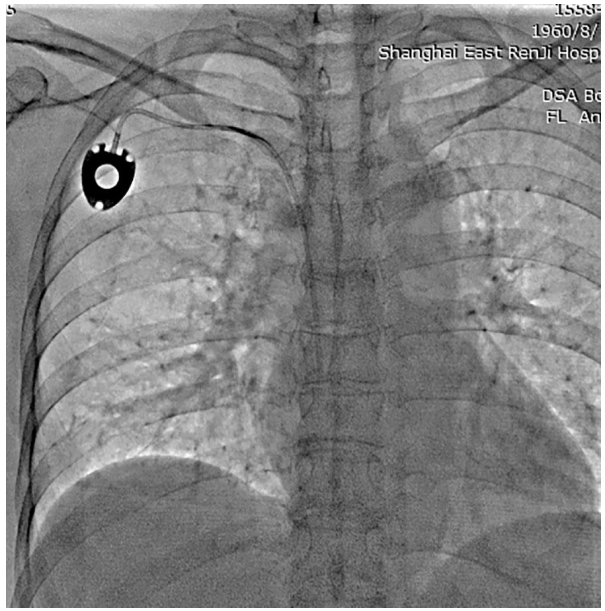
近年来肿瘤化疗中央输液工具选择及趋势

年份	PICC	PORT
2012-2013	90%	10%
2014-2015	50%	50%
2016-2017	40%	60%
2017-2018	30%	70%

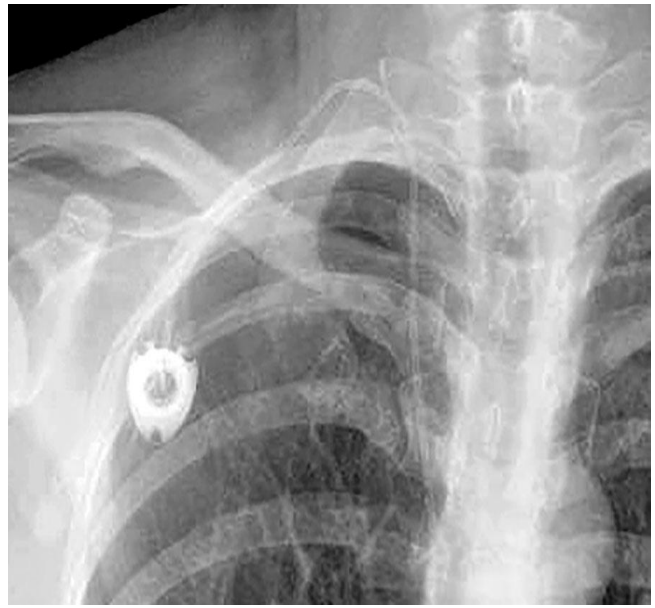
上臂静脉植入



锁骨下静脉植入



颈内静脉植入



静脉输液港植入

- 外周植入-上臂、前臂
  - 上臂：空间大；皮下组织较多、松弛；静脉相对粗，可达到植入导管要求，（导管直径占管腔的45%）
  - 前臂：空间小、皮下组织较少、紧致；静脉相对细，需相对细小的导管才能达到要求
  - 特殊路径：依据临床状况决定
- 中心植入-锁骨下静脉；颈内静脉

为什么要从外周植入

- 有优势吗
- 有先例吗
- 可以做吗

我们做的结果如何？并发症高吗？

有先例吗？

1990年-经外周植入输液港

◆1989-1990 上臂（外周植入）输液港见有报道。

James C. Andrews, MD • Suzette C. Walker-Andrews, RN • William D. Ensminger, MD, PhD

Long-term Central Venous Access with a Peripherally Placed Subcutaneous Infusion Port: Initial Results[1]

A new subcutaneous infusion port and catheter system for long-term central venous access, designed to be implanted in the interventional radiology suite, was evaluated. In 35 patients, a 5-F polyurethane catheter was placed in the superior vena cava via the axillary or brachial venous approach under fluoroscopic guidance. A 2.5 × 2.5-cm² subcutaneous pocket was dissected for the port. The port was then connected to the catheter, and the incision was closed. Ports have been implanted for a total of 5,290 patient days (5–307 days for an individual patient). Blood transfusions, bolus drug administrations, and 5-day outpatient chemotherapy infusions were successful in all attempts. Blood sampling was successful in 98.9% of attempts. No infectious or thrombotic complications were encountered. Acceptance of this device by patients and nursing staff has been excellent. The initial results indicate that this peripherally placed port is a viable alternative for patients requiring long-term central venous access.

Index terms: Catheters and catheterization, technology • Venae cavae, interventional procedure, 566.1299

Radiology 1990; 176:45–47

MAINTAINING reliable venous access in cancer patients remains a challenge to the medical personnel involved in their care. The majority of antineoplastic agents are administered parenterally, as are the blood products and antibiotics that are frequently required. The sclerosing nature of many chemotherapeutic agents quickly leads to occlusion of the available superficial veins.

Previously employed options for achieving long-term venous access include arteriovenous fistulas, large-bore right atrial catheters (such as the Hickman catheter), and central venous catheters connected to subcutaneous infusion ports implanted on the chest wall (1–5). The totally implanted infusion devices have advantages over the external, Hickman-type catheters in that there is a lower infection rate, no daily care is required, and there is less impact on the patient's daily activities. This has led to wide acceptance of the subcutaneous infusion port, with approximately 100,000 ports from a variety of manufacturers being implanted each year.

We have evaluated a new peripherally placed subcutaneous infusion port (Periport; Infusaid, Norwood, Mass) designed to be implanted in the interventional radiology suite.

Figure 1. Top view of the infusion port and catheter system. Note that the septum is set into the base of the conical port body, in line with the catheter. Scale is in centimeters.

and the U.S. Food and Drug Administration.

The infusion port is a hollow plastic cone, 20 mm in length and 10 mm in diameter at the base (Fig 1). The silicone septum, which is set into the base of the port body, is approximately 5 mm in diameter. A flanged stainless steel fitting on the apex of the port body allows secure attachment of the 5-F (1.7-mm outer diameter, 1.0-mm inner diameter) polyurethane catheter included with the port.

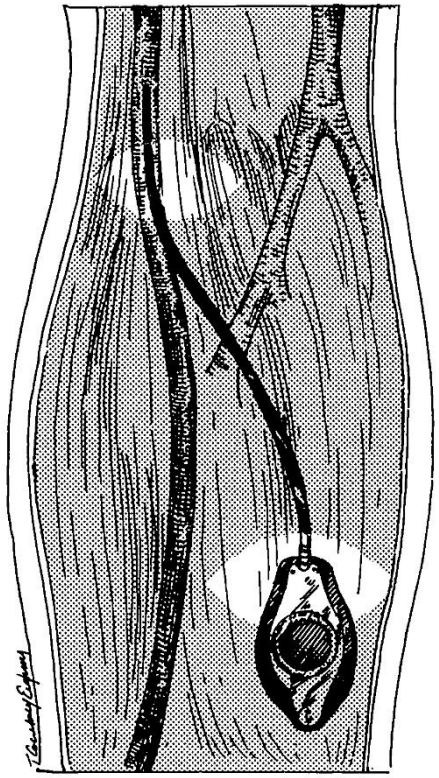
有先例吗？

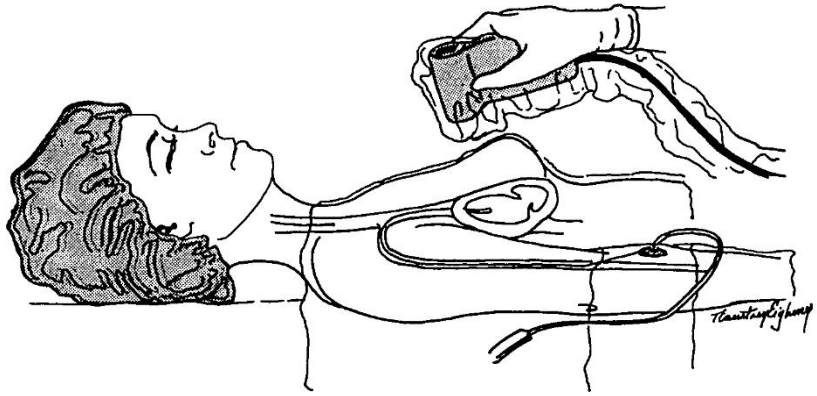
1991年

A PERIPHERALLY IMPLANTED PERMANENT CENTRAL VENOUS ACCESS DEVICE

Peter Morris, MD, Richard Buller, MD, PhD, Sara Kendall, RN, and Barrie Anderson, MD

Totally implanted central venous access devices provide reliable delivery of repetitive chemotherapy courses. However, placement of these ports requires special expertise and facilities, and is not without risk of major complications. This paper reports the technique of placing a new peripherally accessed, totally implantable, central venous port in 22 patients for the repeated administration of systemic chemotherapy. All ports were successfully placed under local anesthesia, with catheter tip location determined by an electronic sensor wand. The ports have been in use for a total of 387 patient-weeks. One port required removal secondary to an infection at the port site. Twenty-one ports have remained functional for infusion and blood sampling through 99 courses of chemotherapy. Acceptance by patients, nurses, and physicians has been excellent. ***(Obstet Gynecol 78:1138, 1991)***





有先例吗？

2006-2011年6年599例-2014年发表

结论

上臂植入方法在安全性和舒适度上，医生和患者均获益。

Upper Arm Central Venous Port Implantation: A 6-Year Single Institutional Retrospective Analysis and Pictorial Essay of Procedures for Insertion

Masatoshi Shiono[1], Shin Takahashi[1], Yuichi Kakudo[1,2], Masanobu Takahashi[1], Hideki Shimodaira[1], Shunsuke Kato[1,2], Chikashi Ishioka[1,2]*

1 Department of Clinical Oncology, Tohoku University Hospital, Tohoku University, Aoba-ku, Sendai, Japan, **2** Department of Clinical Oncology, Institute of Development, Aging, and Cancer, Tohoku University, Aoba-ku, Sendai, Japan

Abstract

Background: The requirement of central venous (CV) port implantation is increasing with the increase in the number of cancer patients and advancement in chemotherapy. In our division, medical oncologists have implanted all CV ports to save time and consultation costs to other departments. Recently, upper arm implantation has become the first choice as a safe and comfortable method in our unit. Here we report our experience and discuss the procedure and its potential advantages.

Methods: All CV port implantations (n = 599) performed in our unit from January 2006 to December 2011 were analyzed. Procedural success and complication rates between subclavian and upper arm groups were compared.

Results: Both groups had similar patient characteristics. Upper arm CV port and subclavian implantations were equivalently successful and safe. Although we only retrospectively analyzed data from a single center, the upper arm group had a significantly lower overall postprocedural complication rate than the subclavian group. No pneumothorax risk, less risk of arterial puncture by ultrasound, feasibility of stopping potential arterial bleeding, and prevention of accidental arterial cannulation by targeting the characteristic solitary basilic vein were the identified advantages of upper arm CV port implantation. In addition to the aforementioned advantages, there is no risk of ''pinch-off syndrome,'' possibly less patient fear of manipulation, no scars on the neck and chest, easier accessibility, and compatibility with the ''peripherally inserted central catheter'' technique.

Conclusions: Upper arm implantation may benefit clinicians and patients with respect to safety and comfort. We also introduce our methods for upper arm CV port implantation with the videos.

Citation: Shiono M, Takahashi S, Kakudo Y, Takahashi M, Shimodaira H, et al. (2014) Upper Arm Central Venous Port Implantation: A 6-Year Single Institutional Retrospective Analysis and Pictorial Essay of Procedures for Insertion. PLoS ONE 9(3): e91335. doi:10.1371/journal.pone.0091335

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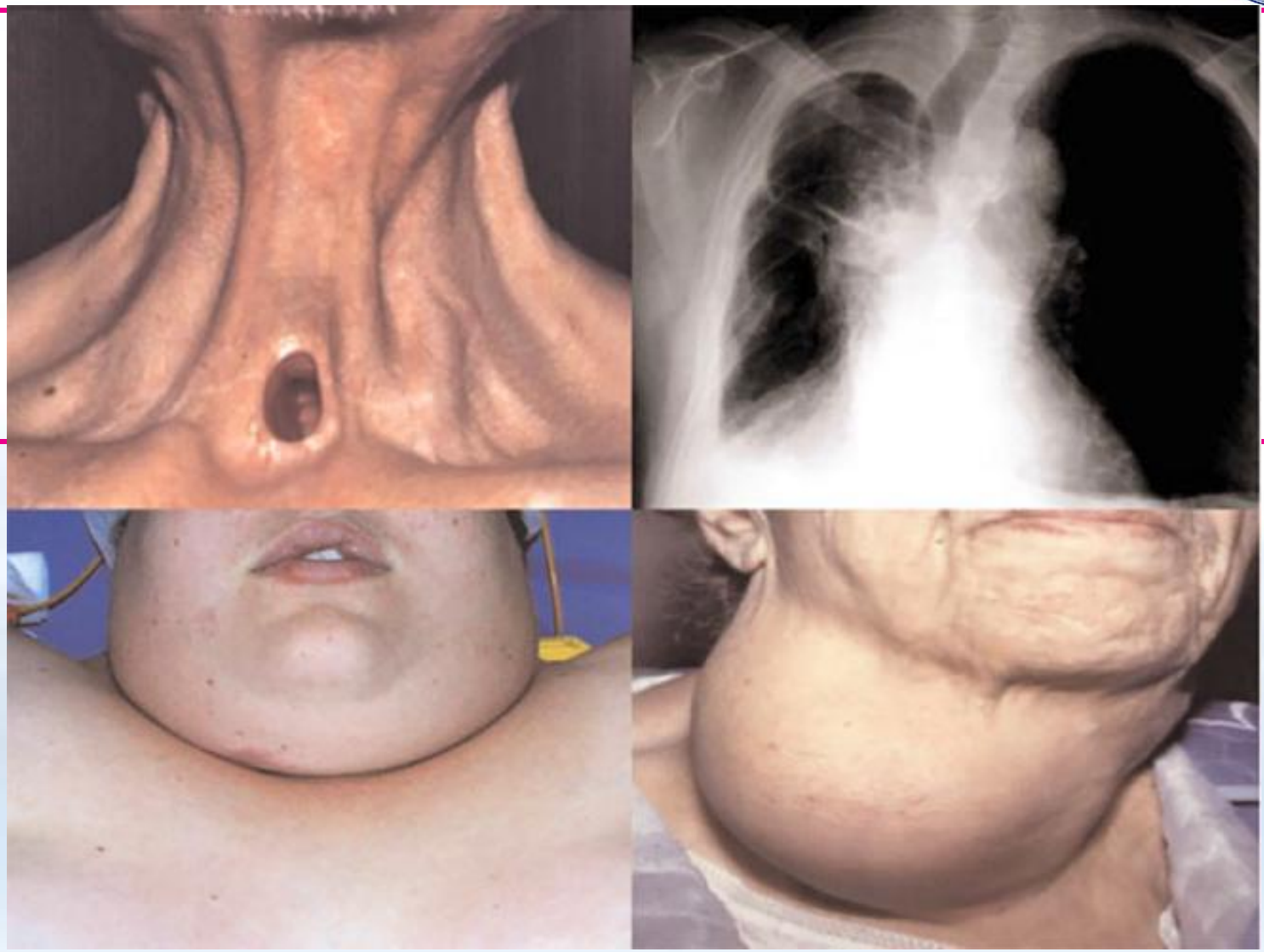
Funding: This study has been funded by a Health Labour Sciences Research Grant from the Japanese Ministry of Health, Labour and Welfare. The funder had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript. No additional external funding received for this study. URL: http://www.mhlw.go.jp/jigyo_shiwake/gyousei_review_sheet/2012/h23_pdf/0240.pdf.

Competing Interests: The authors have declared that no competing interests exist.

* E-mail: chikashi@idac.tohoku.ac.jp

有优势吗？



可以做吗？
怎么做？

外周中心静脉输液港植入的适应症

- 所有需要辅助长期化疗的癌症患者。
- 需要长期静脉应用抗生素的患者（如骨髓炎）等。
- 需要长期静脉营养的患者。
- 需要输入高渗药物的患者。

项目完成情况

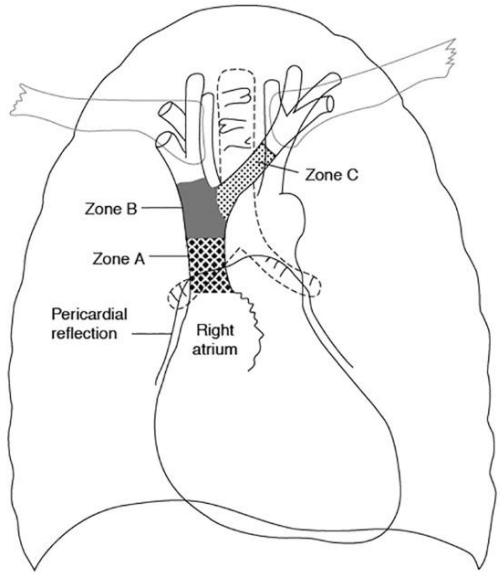
- **超声引导下Seldinger穿刺行上臂输液港植入操作标准和流程的建立：**
- 植入手术在严格的无菌条件下完成。
- 除乳腺癌腋窝淋巴清扫或有心脏起搏器的患者选对侧手臂外，常规选择右侧手臂，置管前嘱患者清洗整个手臂。患者平躺在操作床上，手臂充分外展外旋位。
- 血管超声仪评估血管，优先选择肘关节以上15-20cm、充足的管径、远离动脉、无扭曲的静脉血管，贵要静脉首选。
- 2%洗必泰消毒整个手臂，局部无菌野范围及全身铺无菌大单，操作者穿手术衣，戴无菌口罩、帽子及手套。

项目完成情况

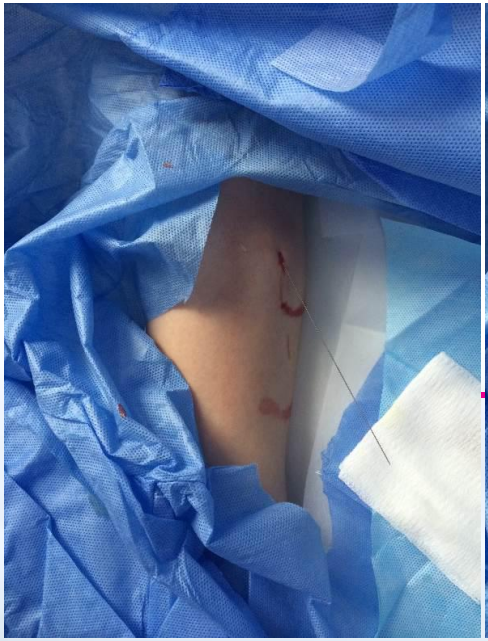
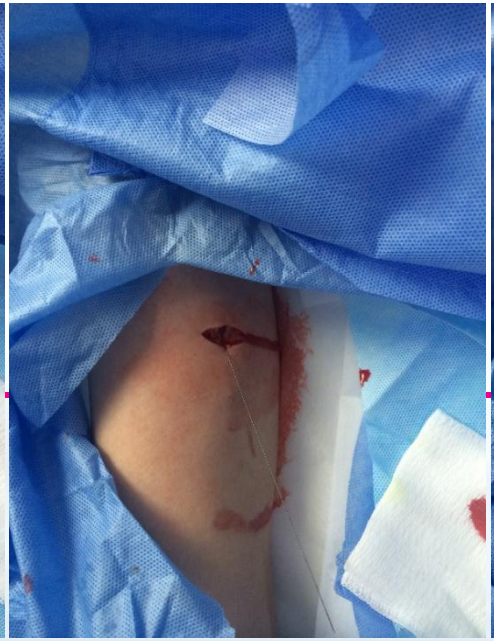
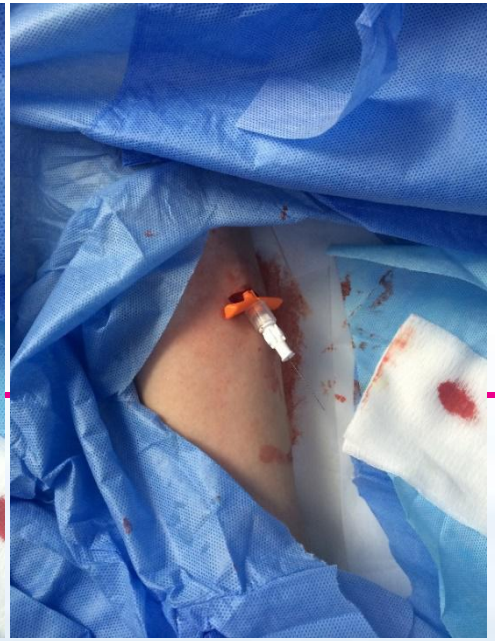
- 扎止血带，2%的利多卡因局部麻醉后，超声引导下用21G的穿刺针穿刺靶血管，见回血后送入0.018in微导丝，移除穿刺针，沿微导丝用血管扩张器(0.5mmID)送入4.5Fr微导管鞘。
- 如选择导管直径是5Fr的输液港，则移除微导丝和血管扩张器后，沿血管鞘直接送入5Fr导管。
- 如选择导管直径是6.5Fr的输液港，移除4.5Fr微导管鞘，沿导丝(0.35in)送入药盒内导管鞘，移除导丝，沿导管鞘送入6.5Fr导管。
- 将5Fr或6.5Fr导管送入上腔静脉和右心房连接处后，试抽回血通畅，0.9%生理盐水10-15毫升冲洗导管，移除血管鞘。

项目完成情况

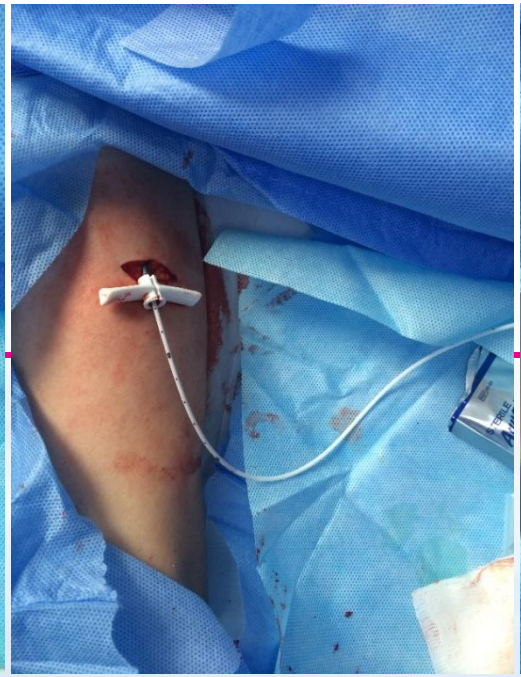
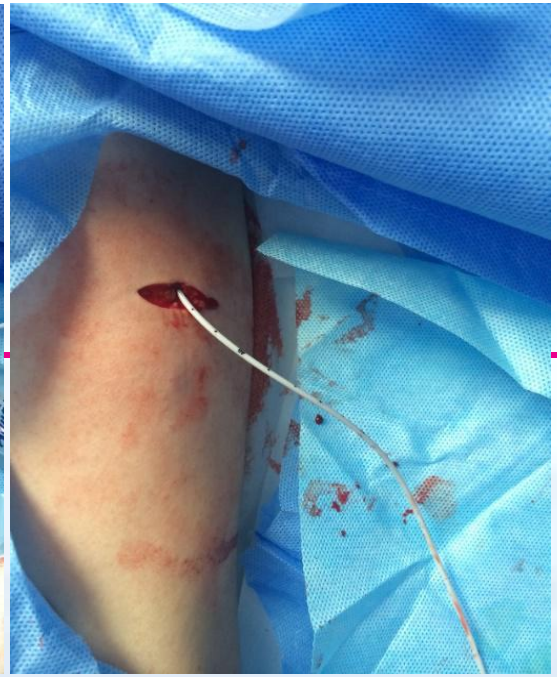
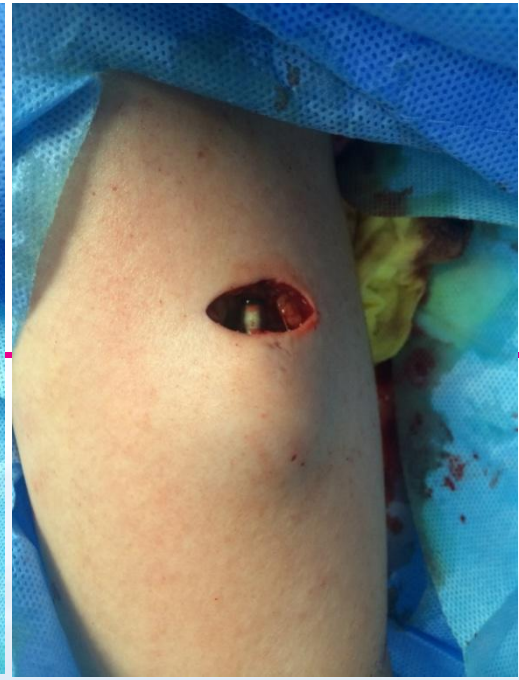
- 将5Fr或6.5Fr导管送入上腔静脉和右心房连接处后，试抽回血通畅，0.9%生理盐水10-15毫升冲洗导管，移除血管鞘。
- 距穿刺点下方建3-4cm皮下隧道，水平切开2-3cm左右皮肤，钝性分离切口下方皮下组织，制作囊袋，囊袋大小以可容纳相应港体为准。
- 透视下确认导管和港体位置、抽回血确认导管通畅，可吸收线缝合皮下组织，注意避免损伤导管，对合伤口后用组织胶水外层固定，无菌敷料包
- 港体植入前后及带管随访期间不常规给予抗生素和抗凝治疗来预防相关并发症。



Operation process


Operation process

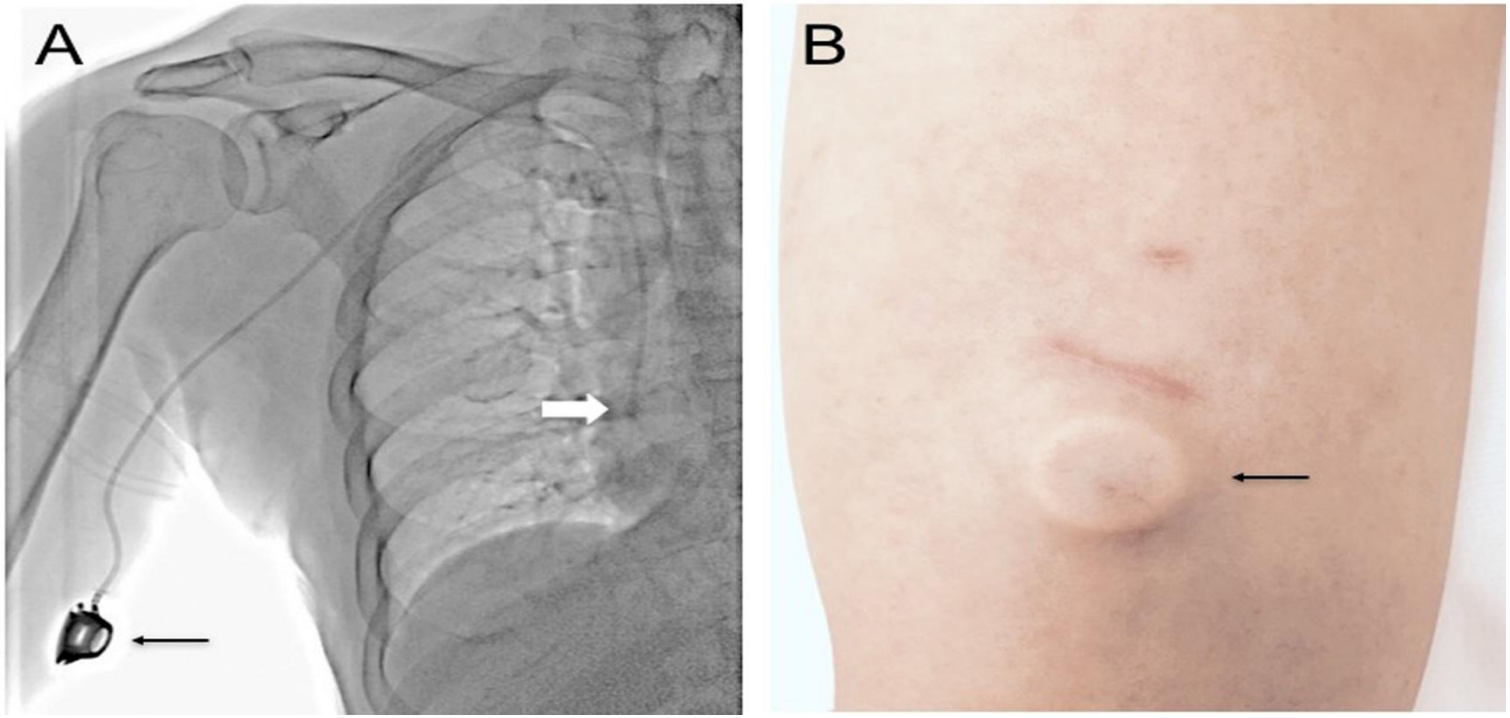


图**1** 上臂植入输液港走行全长及外观。图**1A**显示在超声引导下微穿刺针穿刺贵要静脉后，采用**seldinger**技术交换植入输液港，透视下显示港体（黑箭头）及导管全长，头端位于上腔静脉与右心房交界处（白箭头）；图**1B**显示切口愈合后上臂输液港港体位于上臂中下段皮下（黑箭头），

项目完成情况

- 得出国内上臂输液港大样本临床应用结果的研究资料

1.1 技术成功率及失败原因

- 2014年2月-2016年12月共植入上臂输液港642例，其中右上臂626例(97.5%)，左上臂16例(2.5%)。贵要静脉288例(44.9%)，肱静脉354例(55.1%)。
- 首次输液港植入成功率99.53%（639/642），二次植入成功率100%。3例首次穿刺失败，其中2例误伤神经，1例误伤肱动脉。

项目完成情况

1.2 随访和并发症

- 随访155302个导管日，共发生并发症58例（9.0%），其中早期并发症9例，晚期并发症49例。
- 并发症包括：输液港相关感染28例(4.4%)，导管静脉血栓7例(1.1%)，囊袋出血3例(0.4%)，港体翻转3例(0.4%)，皮肤裂开1例(0.2%)，导管堵塞2例(0.3%)，继发导管异位4例(0.6%)，导管相关性上肢运动受限7例(1.1%)，上肢静脉回流障碍2例(0.3%)，神经损伤1例(0.2%)。
- 无输液港相关死亡事件发生。

上臂输液港早期和晚期并发症发生情况

并发症类型	总发生率，%（例）	事件/1000导管日	平均发生时间 d_t(M±S)	早期并发症，%（例）	晚期并发症，%（例）
感染	4.4（28）	0.18	109±74	0.4(3)	3.9(25)
静脉血栓	1.1（7）	0.05	85±105	0.2(1)	0.9(6)
囊袋出血	0.4（3）	0.02	1±0.5	0.4(3)	0.0(0)
导管继发移位	0.6（4）	0.03	217±182	0.0(0)	0.6(4)
港体翻转	0.4（3）	0.02	36±25	0.3(2)	0.2(1)
皮肤裂开	0.2（1）	<0.01	128	0.0(0)	0.2(1)
导管堵塞	0.3（2）	0.01	266±109	0.0(0)	0.3(2)
静脉回流障碍	0.3（2）	0.01	208±15	0.0(0)	0.3(2)
导管相关性上肢运动受限	1.1（7）	0.05	159±61	0.0(0)	1.1(7)
正中神经损伤	0.2（1）	<0.01	65	0.0(0)	0.2(1)
合计	9.0（58）	0.37	127±105	1.3(9)	7.7(49)

本研究结果和以往相似研究结果的比较

研究文献	PORT位置	病例数（例）	总导管日（天）	并发症/1000导管日	感染率/1000导管日	血栓发生率/1000导管日	气胸发生率/1000导管日
Biffi等[13]	胸壁	403	59514	1.01	0.18	0.57	0.13
Cil等[15]*	胸壁	476	178997	0.29	0.06	0.04	0.1
Lorch等[11]	胸壁	125	11056	1.81	0.27	0.27	0.18
Brothers等[14]	胸壁	329	116208	1.4	0.5	0.1	0.06
Lenhart 等[7]*	前臂	399	98633	0.46	0.12	0.05	0.0
Klösges等[33]	前臂	299	90276	0.74	0.18	0.12	0.0
Laura等[34]	上臂	205	33619	1.16	0.30	0.27	0.0
Marcy等[6]	上臂	100	22200	0.72	0.27	0.14	0.0
Busch等[32]	上臂	507	127750	0.39	0.21	0.06	0.0
本研究	上臂	642	155302	0.37	0.18	0.05	0.0

质性研究—生活质量和满意度

◆正性体验

本研究中所有患者均反映使用输液港化疗不影响他们的日常生活，生活质量和舒适度大大提高，且部分患者有PICC置管史，和以前使用PICC相比，他们对输液港的使用体验尤为满意。

J：“我以前使用的是点，PICC，洗澡真是不方便，现在感觉好多了，尽管价格贵现在看看还是值的。”A：“我以前化疗用PICC，贴膜过敏，痒的很难受，现在换了输液港，真是方便啊，不痒了，活动也方便了，早知道到这样我一开始就选择输液港了。”

质性研究—生活质量和满意度

◆负性体验

尽管输液港有较多优势，但由于价格昂贵且大多在经济发达的地区及大型综合医院推广开展，尚未在基层医院推广，部分患者经历了输液港在外院甚至置管医院护士不给使用和维护的经历。

E：“我上次发热来你们医院急诊，要挂盐水，我说我有输液港，可急诊当班护士说不知道怎么使用，就另外给我扎在手上了。”L：“我们当地的医院没有这个技术，也没有针头，但会使用和维护，我这次又要从这里带些针头回去，好麻烦”。

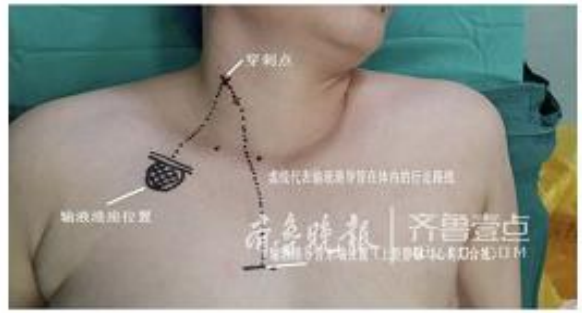
推广应用

本项目在实施期间分别接受了来自河南、宁夏、山东的三名肿瘤医生，在我科进行了为期半个月的本技术的进修学习，学成后三名医生均已在当地医院开展此项技术，满足了当地患者的医疗服务需求。

日照市医院肿瘤科顺利开展“植入式静脉输液港”技术

齐鲁壹点 01-23 10:06

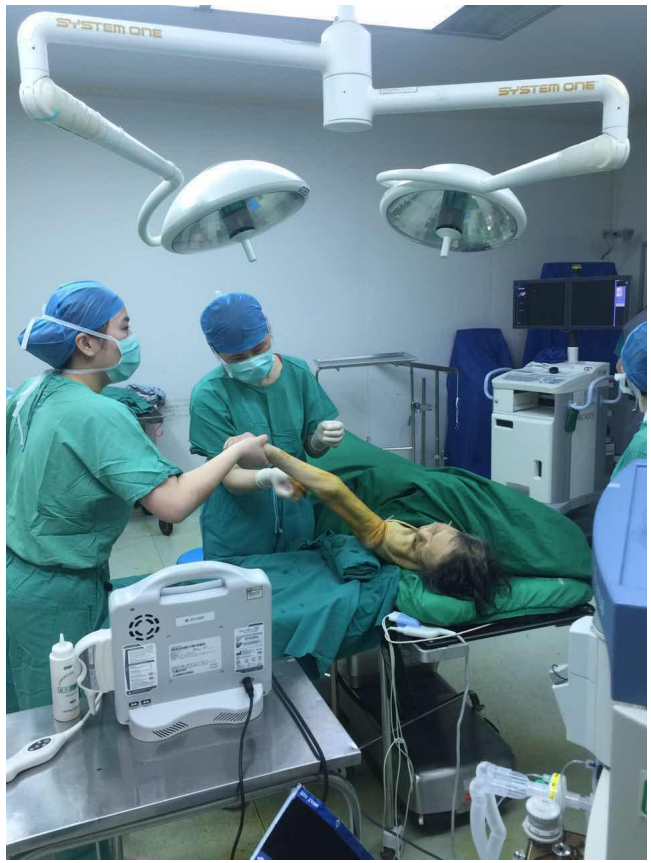
在患者胸部皮肤下植入一枚纽扣大小的“静脉输液港”，便可解决患者因反复输液导致无血管可扎或长期输液导管留置的问题。1月13日，日照市人民医院肿瘤科为两名肿瘤患者成功施行了该院首例输液港植入手术。



据了解，输液港是国外发达国家首选的中、长期输液工具，这种专门为需要长期及重复输液的患者设置的输液港，可终身携带，亦可根据病情随时取出，成为

推广应用

- **接待手术观摩学习、技术指导：**本项目实施后共接待两批共6人本别来自北京积水潭医院、宁夏石嘴山医院的医护人员的手术观摩学习和技术指导。



学术交流

国际交流：亚洲国际肿瘤会议特邀学术报告：

- 仇晓霞，Peripherally Implanted Central Venous Port Catheter in cancer patient ,AONS2015 Conference,Korea,Seoul,19-21November 2015

学术交流

国内交流：中国抗癌协会肿瘤介入治疗学术报告：

仇晓霞，上臂输液港临床应用及安全管理,第三届肿瘤微创介入治疗规范化研究学习班，2016，北京，16-19日

教育培训

- 分别于2014.12.17日及2016.11.11日仁济医院作为主办方和承办人举办两届“江、浙、沪”上臂输液港植入和管理新技术研讨会。

conclusion

- We consider that PICVP, compared with subclavian or internal jugular implantation, can provide safety and comfort benefits to both medical workers and cancer patients.
- We hope that this procedure will become more common.
- As for safety, maintenance of quality of life, and cost-effectiveness, a prospective multicenter randomized control trials is needed to eventually validate its non-inferiority or superiority to subclavian or internal jugular procedures .

医护团队职责及分工

护士

- 评估宣教
- 协助病人及家属合理选择输液工具
- 专职护士参与输液港植入
- 护士规范使用和维护
- 常见并发症观察及处理
- 健康教育和指导

医生

- 手术谈话及签字
- 输液港植入
- 手术记录
- 并发症处理
- 输液港移除

谢谢聆听！