

A Case of Treatment of Unresectable Liver Metastases from Colorectal Cancer, Using Surgical Procedure "ALPPS"

**Jihun Choi, Jae Hyun Kim, Kyoungwon Jung, Sung Eun Kim,
Won Moon, Moo In Park, Seun Ja Park**

Department of Internal Medicine, Kosin University College of Medicine, Busan, Korea

1. Case presentation

68세 남자가 건강검진 중 발견된 간종괴를 주소로 타 대학병원을 방문하였다. 과거력상 특이사항이 없었으나, 거의 매일 소주 1병의 음주력, 40갑년의 흡연력을 가지고 있었다. Abdomen CT 결과, Liver에 multifocal mass, descending colon에도 mass forming lesion 발견되어 Colonoscopy 시행 하였고, AV40 cm에서 35 cm에 이르는 diffuse infiltrating mass가 발견되어 biopsy를 시행, liver에 대해서도 Percutaneous biopsy를 시행하였다. 조직검사 결과 Colon은 Adenocarcinoma, moderated differentiation, Liver mass biopsy 결과 Adenocarcinoma, c/w metastatic carcinoma {CK7(-), CK19(+), CK20(+)}으로 Descending Colon Cancer with multiple liver Metastases로 최종 진단되어 치료를 위하여 본원 내원하였다.

2. Diagnosis

Descending Colon Cancer with Multiple liver metastases

3. Therapy and Clinical course

환자는 진단 당시 Liver metastases에 대하여 Curative resection이 불가능하여 Palliative Chemotherapy (FOLFIRI)로 치료를 시작하였다. K-RAS mutation (+)로, 2 번째 cycle 부터는 Bevacizumab을 추가하여 시행하였고 9차례 항암화학요법 이후 전이성 병변은 현저히 줄어들어 외과와의 협진을 통하여 Primary colon cancer에 대한 resection과 전이성 간 병변에 대하여 curative resection을 시도해 보기로 하였다. Open LHC c ALPPS (Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy) 술식을 통하여 성공적으로 Extended hepatectomy를 시행하였다. 치료 시작시 CEA level이 108 ng/ml 이었으나, 9차례 항암화학요법 이후 6.11 ng/ml, 수술 이후 2.90 ng/ml로 나타났다. 이후 FOLFIRI 항암화학요법을 지속하며, 현재 건강하게 외래에서 경과 관찰 중에 있다.

4. Conclusion

대장암의 전이성 병변의 수술적 제거는, 생존율 향상이 입증된 치료 방법이다. 처음 진단시 15-20%의 환자가 절제 가능한 상태이며, 항암화학요법 이후 10-30%의 환자가 추가로 절제 가능한 환자가 된다. 항암화학요법과 절제는 colorectal liver metastases 치료의 근간이며, 의료기술이 발전함에 따라 우리가 선택 가능한 치료의 옵션도 증가하고 있어 다각도의 접근이 필요하다. 본 증례 역시 발전한 수술기법으로, 기존의 절제 불가능했던 전이성 병변을 제거함으로써 보다 더 나은 치료 옵션을 제공했던 예로 보고하는 바이다.

Key Words: Colorectal cancer, Liver Metastases, ALPPS

REFERENCES

1. Adam R, Laurent A, Daniel A, et al. Two-Stage Hepatectomy: A Planned Strategy to Treat Irresectable Liver Tumors. *Ann Surg.* 2000 Dec;232(6):777-785
2. Goldberg RM, Fleming TR, Tangen CM, et al. Surgery for recurrent colon cancer: strategies for identifying resectable recurrence and success rates after resection. Eastern Cooperative Oncology Group, the North Central Cancer Treatment Group, and the Southwest Oncology Group. *Ann Intern Med* 1998; 129:27.
3. Andreas A, shnitzbauer, Sven A, Lang, et al. Right Portal Vein Ligation Combined With In Situ Splitting Induces Rapid Left Lateral Liver Lobe Hypertrophy Enabling 2-Staged Extended Right Hepatic Resection in Small-for-Size Settings. *Ann Surg.* 2012 Mar;255(3):405-14.

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Case Presentation

- 68/M
- **CC** : Further evaluation and proper Treatment
- **Present illness**
 - 건강 검진 중 발견된 간종괴를 주소로 타 대학병원을 방문하여 Evaluation 시행 후 Descending colon cancer with multiple liver metastases로 진단되어 치료 위하여 본원 내원.

Case Presentation

- **Past medical history**
 - DM/HTN/Tbc/Hepatitis (-/-/-/-)
 - Pre Op. Hx(-)
- **Social history**
 - Smoking : 현재 금연, 40 pack*year
 - Alcohol : 소주 1병, 6회/주, 40년
- **Family Hx.**
 - Non Specific

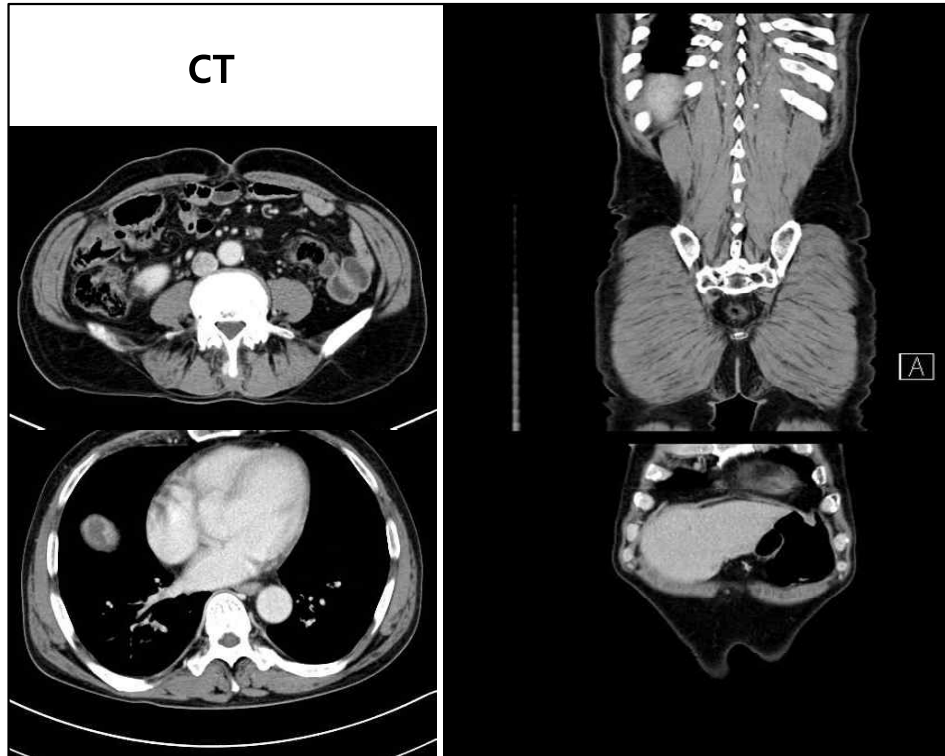
Intital Lab & Bx.

- **Biopsy Report**

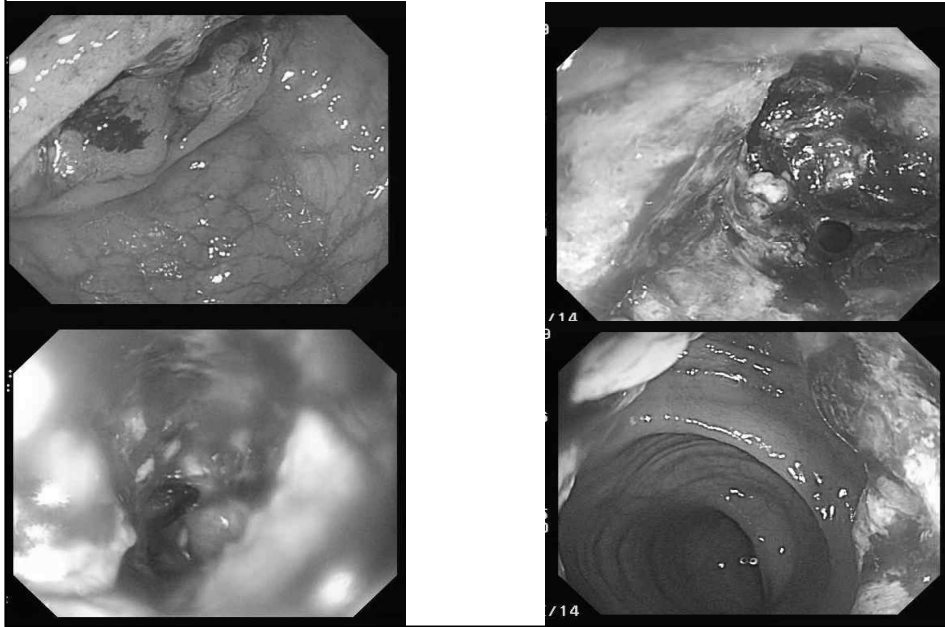
- 2016.06.28. Liver mass Bx.
 - Adenocarcinoma, c/w metastatic carcinoma
 - CK7(-), CK19(+), CK20(+)
- 2016.06.28. Colonoscopy AV70cm, Bx.
 - Adenocacinoma, moderate differentiated

- **Initial tumor marker**

- CEA / CA19-9 : 108.1 / 1.11



Colonoscopy

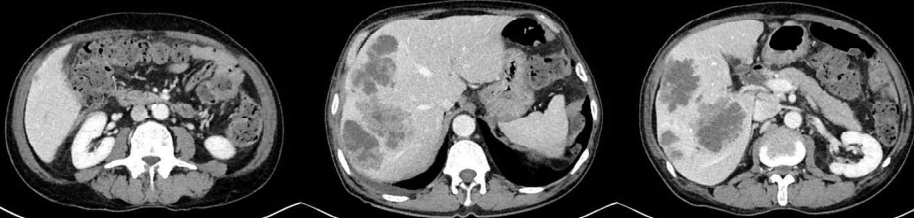


Clinical Course

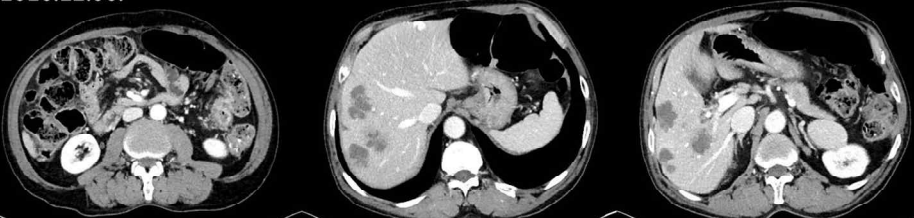
- 2016.07.22. Palliative FOLFIRI CTx. Start
- 2016.08.08. ~ 2016.10.22.
Palliative Bevacizumab + FOLFIRI CTx. #6 시행
- 2016.11.04. Palliative 1-8 FOLFIRI CTx. (수술 고려로 Bevacizumab stop)
- 2016.11.19. Palliative 1-9 FOLFIRI CTx.

Clinical Course

2016.07.18.



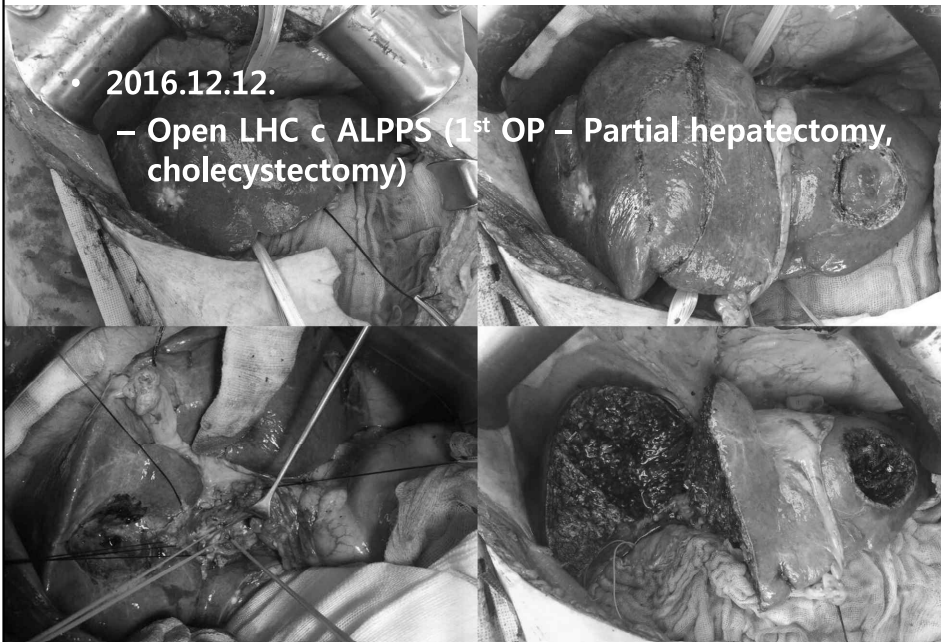
2016.12.06.



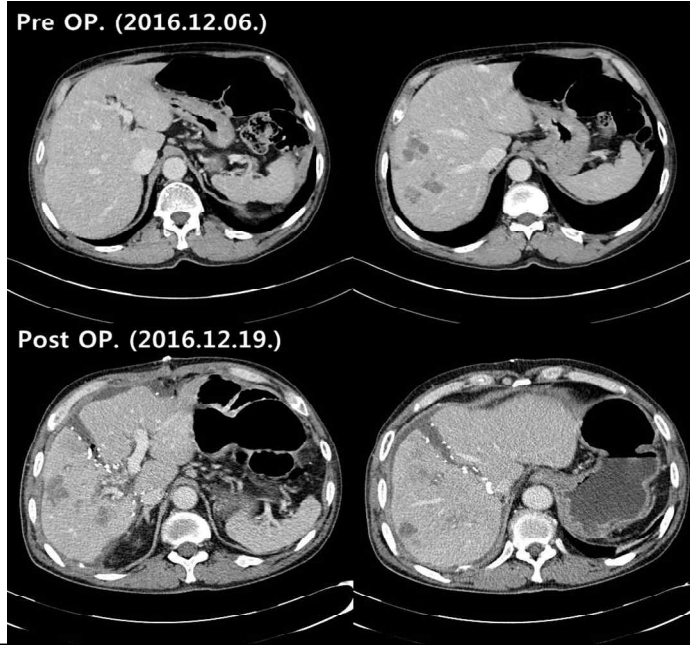
Clinical Course

• 2016.12.12.

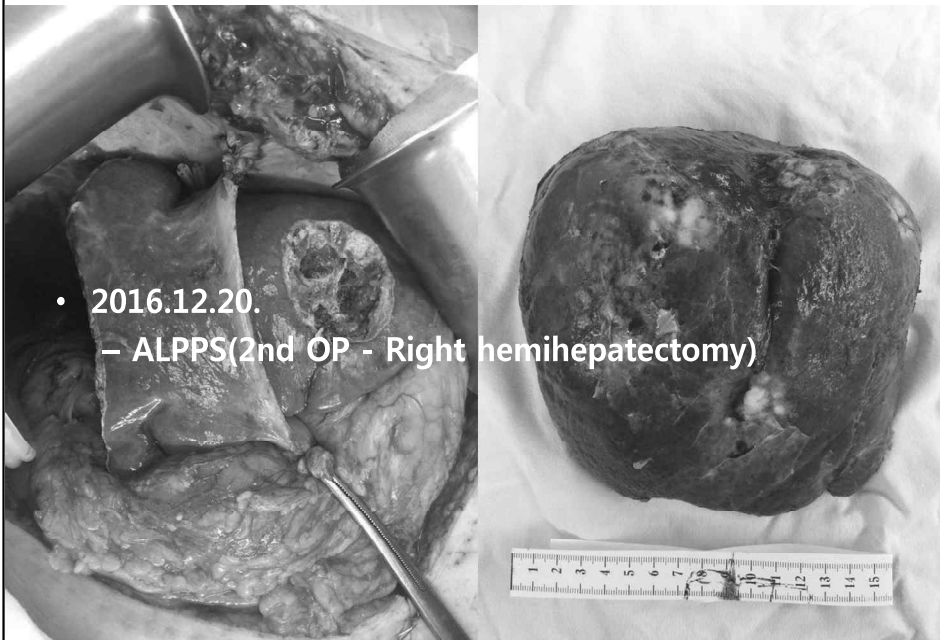
– Open LHC c ALPPS (1st OP – Partial hepatectomy, cholecystectomy)

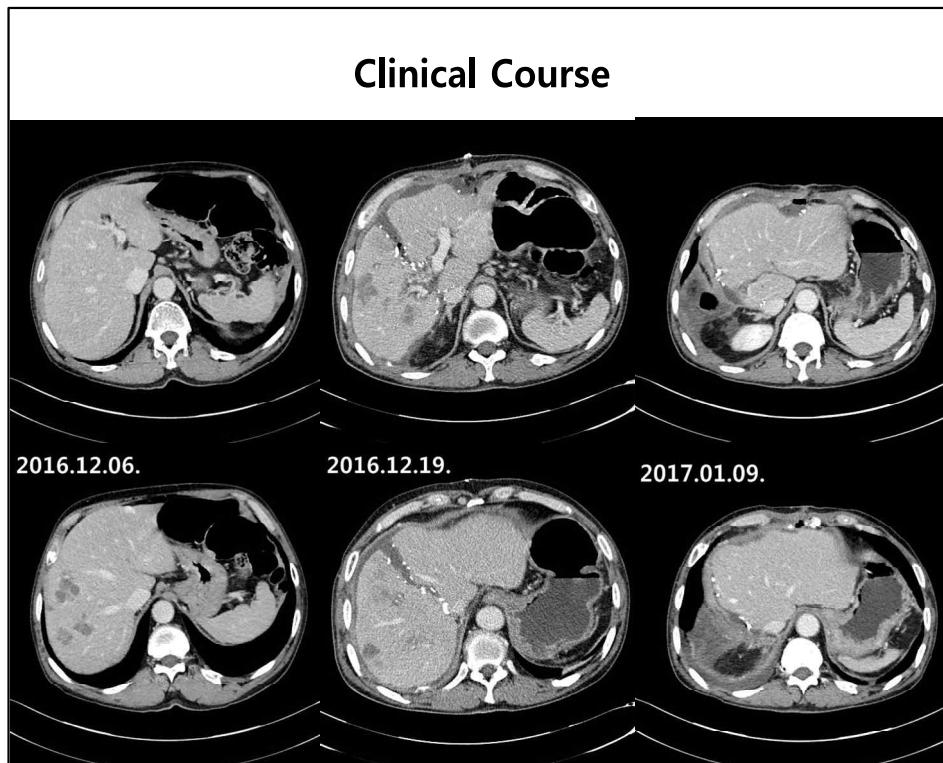


Clinical Course



Clinical Course





Clinical Course

- 2017.01.11. 1-10 FOLFIRI CTx.
- 2017.02.08. 1-12 Bevacizumab + FOLFIRI
- 2017.02.22. 1-13 Bevacizumab + FOLFIRI (DR80%, d/t Neutropenia)
- 2017.03.08. 1-14 Bevacizumab + FOLFIRI (DR64%)

Clinical Course

Date	CEA (ng/ml)	비고
2016.07.14. (Admission)	108.10	
2016.07.22.		1-1 FOLFIRI CTx. Start
2016.09.05. (Post #3)	6.59	
2016.10.17. (Post #6)	4.84	
2016.12.05. (Post #9)	6.11	
2016.12.12.		LHC c ALPPS (Partial hepatectomy)
2016.12.20.		ALPPS (Rt. Hepatectomy)
2016.01.06.	2.90	
2016.01.10.		1-10 FOLFIRI CTx.
2016.02.20.(Post #12)	3.42	
2016.03.07.	4.19	

Review

- **Liver Regeneration**

- **ALPPS**

Associating Liver Partition and

Portal Vein Ligation for Staged Hepatectomy

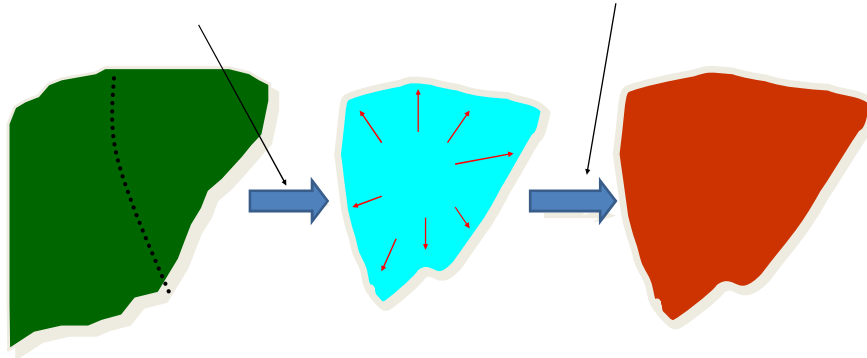
Liver Regeneration (After liver resection) : Initiation and Termination Signals

Hemodynamic Change

nutrients, hormone in portal blood flow

Termination signals

TGF- β 1, cell surface modulator



HGF, TNF- α , IL-6, insulin, EGF, TGF- α , PG
자극인자간의 상호작용

Right Portal Vein Ligation Combined With In Situ Splitting Induces Rapid Left Lateral Liver Lobe Hypertrophy Enabling 2-Stage Extended Right Hepatic Resection in Small-for-Size Settings

Andreas A. Schnitzbauer, MD,* Sven A. Lang, MD,* Holger Goessmann, MD,† Silvio Nadalin, MD,§
Janine Baumgart, MD,|| Stefan A. Farkas, MD,* Siefan Fichtner-Feigl, MD,* Thomas Lorf, MD,¶
Armin Goralczyk, MD,¶ Rüdiger Hörbelt, MD,# Alexander Kroemer, MD,* Martin Loss, MD,* Petra Rümmele, MD,‡
Marcus N. Scherer, MD,* Winfried Padberg, MD,# Alfred Königsrainer, MD,§ Hauke Lang, MD,||
Aiman Obed, MD,¶ and Hans J. Schlitt, MD*

Objective: To evaluate a new 2-step technique for obtaining adequate but

often face the dilemma that the remaining liver tissue may not be sufficient. Preoperative portal vein embolization has thus far been established as the standard procedure for achieving resectability.

Methods: Two-staged hepatectomy was performed in patients who preoperatively appeared to be marginally resectable but had a tumor-free left lateral lobe. *Marginal resectability* was defined as a left lateral lobe to body weight ratio of less than 0.5. In the first step, surgical exploration, right portal vein ligation (PVL), and in situ splitting (ISS) of the liver parenchyma along the falciform ligament were performed. Computed tomographic volumetry was performed before ISS and before completion surgery.

Results: The study included 25 patients with primary liver tumors (hepatocellular carcinoma: n = 3, intrahepatic cholangiocarcinoma: n = 2, extrahepatic cholangiocarcinoma: n = 2, malignant epithelioid hemangioendothelioma: n = 1, gallbladder cancer: n = 1 or metastatic disease [colorectal liver metastasis]: n = 14, ovarian cancer: n = 1, gastric cancer: n = 1). Preoperative CT volumetry of the left lateral lobe showed 310 mL in median (range = 197–444 mL). After a median waiting period of 9 days (range = 5–28 days),

I (12 events), grade II (13 events), grade III (14 events, III a: 6 events, III b: 8 events), grade IV (8 events, IV a: 3 events, IV b: 5 events), and grade V

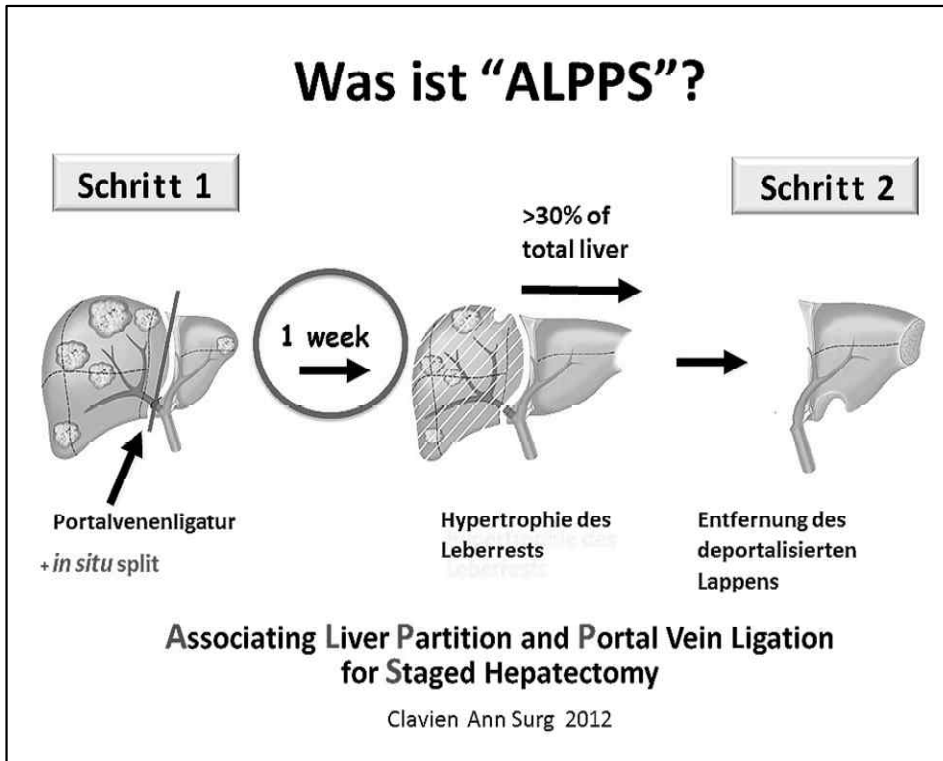
overall survival of 86% at 6 months after resection.

Conclusions: Two-step hepatic resection performing surgical exploration, PVL, and ISS results in a marked and rapid hypertrophy of functional liver tissue and enables curative resection of marginally resectable liver tumors or metastases in patients that might otherwise be regarded as palliative.

(*Ann Surg* 2012;255:405–414)

In patients with primary or metastatic hepatic malignancies, surgical resection is the only potentially curative therapeutic option, especially if extrahepatic tumor manifestation is absent. Because of the impressive development of intra- and perioperative management within the past 2 decades, even major hepatectomy can be performed with acceptable morbidity and mortality. However, “resectability” of primary or metastatic liver cancer is not clearly defined so that, in many cases, the experience of the individual surgeon plays a pivotal role. One very important limiting factor for performing major liver

Ann Surg. 2012 Mar;255(3):405-14



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