



"Rendez – Vous" as a Solution for Biliary Duct Cancer

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Biliary Duct Cancer

- **Biliary tract cancers** consist of cancer of the gallbladder, the **bile ducts**, and the ampulla of Vater,

Bile ducts:
intrahepatic,
perihilar,
distal extrahepatic biliary tree,

- They are highly lethal because most are locally advanced at presentation,
- Gallbladder cancer – **2/3** of these cancer patients,
bile duct cancer – **1/3**.



Biliary Duct Cancer

- Cholangiocarcinoma is a rare tumor in developed countries; there are approximately **5,000** cases per year in **United States**.
- **Poland:** (2011) gallbladder **1207**
bile ducts and ampulla of Vater **627**
- It is one of the most common cancers in endemic areas of developing countries, as high as 87 per 100,000 people in **northeast Thailand**.
- Cholangiocarcinoma accounts for **about 20% of the primary liver cancer** in Western countries, and **<10%** in Asian nations that are endemic for HCC.

Biliary Duct Cancer

Diagnostic Work-Up for Carcinoma of the Bile Duct

General

- History,
- Physical examination,
- **Laboratory studies**
- Complete blood cell counts,
- Blood chemistry profile to include liver function studies,
- Tumor markers: CA 19-9, CEA.

Radiographic studies Standard

- Computed tomography scan,
- Ultrasonography,
- Transhepatic cholangiography,
- Endoscopic retrograde cholangiopancreatography.
- **Optional**
- Endoscopic ultrasound,
- Magnetic resonance cholangiopancreatography,
- Dynamic computed tomography scan,
- Arteriography.



Biliary Duct Cancer

- **Surgical excision** of all detectable biliary tract cancers is associated with improvement in long-term survival,
- Ampulla of Vater location – **better prognosis,**
- Klatskin tumor (intrahepatic, perihilar) – **worse prognosis,**
- For **unresectable tumors**, the purpose of treatment is to palliate symptoms such as obstructive **jaundice**, biliary tract infection, pain, and ascites,

Brachytherapy can be one of the treatments of choice.

Biliary Duct Cancer - treatment

1. The only curative treatment is **radical surgical excision**,
2. However, because of the propensity of cholangiocarcinomas to invade the hepatic artery, portal vein and other vital structures this is **only feasible in 10 to 15% of cases** and is associated with **an operative mortality of 5 to 10%**,
3. Effective **palliation is achieved by biliary decompression.**
4. This is carried out **either surgically** by using bypass procedures such as hepaticojejunostomy or nonoperatively by **endoscopic or percutaneous insertion of biliary endoprotheses**,
5. **Indications for brachytherapy include all malignant strictures of the bile duct which can be cannulated.**
6. Patients should be fit enough for the procedure and have been reviewed to confirm that they are not suitable for resection.
7. Combined treatment is possible in patients who are in reasonably good condition; it is usual to combine **brachytherapy (BT)** with external beam radiation therapy (EBRT)



Greater Poland Cancer Center - indications

PDR

Treatment	Indications	Applicator	Ref. Point (CTV)	Pulse dose	Pulse frequency	Total dose
Radical	Inoperable tumors, combined with EBRT (40 Gy)	French 5	1.0 - 2.0 cm	0.5 - 0.8 Gy	every 1 h (recommended)	2-3 fractions of 20.0 Gy
Radical after surgery	After non radical resection	French 5	0.5 - 2.0 cm	0.5 - 0.8 Gy	every 1 h	40 - 50.0 Gy (2-3 fractions)
Palliative	Obstructive jaundice	French 5	1.0 - 2.0 cm	0.5 - 1.0 Gy	every 1 h	20 - 40.0 Gy

Greater Poland Cancer Center material

- Our aim was to assess the feasibility of intraluminal palliative brachytherapy in the treatment of locally advanced bile duct cancer using **trans-hepatic "rendez-vous" technique**.
- **Indications for brachytherapy** include all malignant strictures of the bile duct that can be cannulated.
- Percutaneous trans-hepatic technique was used to implant catheters into bile ducts.



Greater Poland Cancer Center material

- The decision to irradiate patients was based on clinical presence of a tumor and increased risk of jaundice.
- This technique allowed the passage of a catheter through the bile duct stricture.
- Details of technique are presented, and summarized published data are discussed.

Material and methods

- **48 patients** with advanced bile duct cancer,
- **disqualified from surgery or radical external beam radiation therapy (EBRT)**, were treated with trans-hepatic technique and intraluminal brachytherapy,
- **44 patients** - exclusively with brachytherapy,
- **4** were treated with brachytherapy and concomitant **chemotherapy or surgery (stents)**,
- We choose **PDR-BT** instead of HDR-BT (High-Dose-Rate) because of short one-day treatment time which was well accepted by the patients.



Material and methods

Clinical data	Number of patients
Age: Median Range	62,1 40 - 84
Gender: Male Female	20 (41,7%) 28 (58,3%)
Tumor Site: Klatskin Tumor Perihilar and CHD Extrahepatic bile duct Gall-bladder and extrahepatic bile duct Papilla Vateri Diffuse *	11 8 17 8 3 1
Pathologic type: Adenocarcinoma Cholangiocarcinoma Carcinoma solidum adenogenes Cell ca	17 1 2 28

CHD – common hepatic duct, CBD – common bile duct ; * Included patients with >2 sites of extrahepatic biliary ducts

Material and methods

Characteristic of given treatment modality

Clinical data	Number of patients
Treatment: Primary tumor – radical treatment Primary tumor – palliative treatment Recurrent tumor after surgery Palliative treatment and chemotherapy Palliative treatment and anastomosis	4 33 7 2 2
PDR description (pulse of 0,8 Gy): 1 x 20 Gy 2 x 20 Gy 1 x 25 Gy Interrupted treatment (worsening of patient's condition)	38 8 1 1
Interval: 60 minutes 55 minutes 50 minutes	24 20 4
Reference point: 1,5 cm 1.0 cm	11 37

LC – local control, CR – complete remission, PR – partial remission, NR – no remission



Material and methods

1. **Brachytherapy - in the same day** after insertion of intraductal catheter,
2. **Cholangiography** was made to compare current status with earlier **x-ray's**,
3. **Treatment planning was based on radiography** taken with the applicator in place and the **cholangiogram** showing the malignant stenosis,
4. **Target Volume** encompassed tumour visualized at cholangiography and a **1 or 2 cm margin** taken proximally and distally,
5. Dose was **prescribed at 10 or 15 mm** from the source axis,
6. The length of the **reference isodose** encompassed the Planning Target Length as closely as possible,
7. PLATO brachytherapy planning system was used,
8. For PDR brachytherapy microselectron PDR (Nucletron®) unit was used, with radioactive ¹⁹²Iridium source, with 1 Ci (Curie) nominal activity.

Results

Remission	Number of patients
LC after 4 weeks:	
CR	3
PR	26
NR	12
Progression	6
Lack of observation	1

LC – local control, CR – complete remission, PR – partial remission, NR – no remission

- **Decline in performance status was observed during brachytherapy in one patient with metastasis in liver, which didn't end the treatment and in another, when after 4 weeks we noted massive progression to the liver,**

- **Longest survival time carried out 60 months ,**

- **7 patients with bile duct cancer survive longer then 12 months.**



Results

- All patients with advanced bile duct cancer had an unfavorable prognosis.
- In **65.5% of bile duct cancer cases, clinical improvement** (decrease in jaundice) was noted in first control after 4 weeks.
- Median **OS** for patients with bile duct cancer was **11.2 months**.

Complications

- Complications connected with technique we didn't observe.
- In one case treatment was interrupted due to rapid worsening of performance status.



Conclusions

- It has been established that the use of brachytherapy is feasible and has a low early complication rate.
- A percutaneous trans-hepatic technique allows for the whole treatment (insertion of catheter, brachytherapy) to be performed in 1 day (24 hours of PDR-BT).
- In most cases, a satisfactory palliative effect can be achieved.

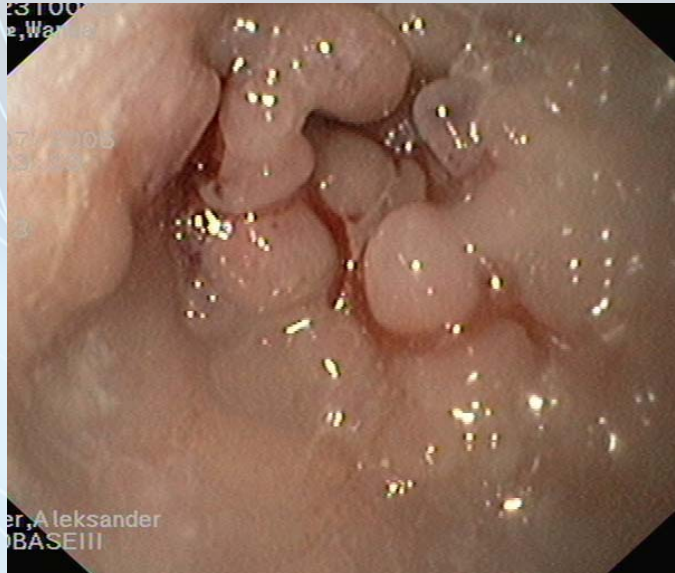
Bile duct - results of combined EBRT and BT - literatur review. Regarding the outcome with different treatment schedules, the **very inhomogeneous patient groups** should be taken into account.

Author	Number of patients	EBRT, dose (Gy)	BT, number of fractions, fraction dose, method	Results of treatment	Statistical analysis
Shin et al.	27	36 – 55 (median 50.4)	1. No 2. 3 x 5 Gy HDR	1. RR – 53% 2. RR – 36% 1. MDC – 5 months 2. MDC – 9 months 1. OS (2 y) – 0% 2. OS (2 y) – 21%	RR – p>0.05 MDC – p=0.06 OS – p=0.015
Schleicher et al.	30	median 30	1. No 2. median 40 Gy, 4-5 fractions, HDR	1. OS – 3.9 months 2. OS – 9.1 months	OS – p <0.05
Eschelmann et al.	11	25 – 56	15 – 31 Gy LDR	MS – 22.6 months	n.d.
Kamada et al.	145	1. 40 – 50 2. 40 – 50	1. No 2. 25 Gy LDR	1. MS – 4.3 months 2. MS – 9.3 months	n.d.
Gonzalez Gonzalez et al.	38	1. 44 – 68 2. 33 - 47	1. No 2. 22 – 25 Gy LDR	1. MS – 10.5 months 2. MS – 10.5 months	n.s.
Takamura et al.	93	50	27 – 50 Gy (median 39.2) LDR	MS – 12 months	n.d.

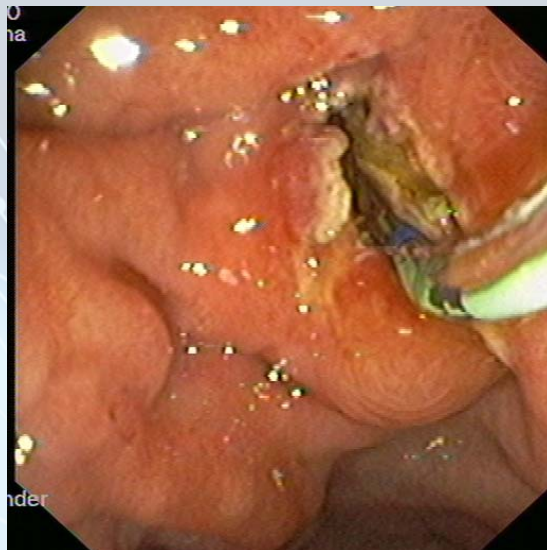
• Note: in papers of Shin, Schleicher, Kamada and Gonzalez Gonzalez two different groups are compared.
 • EBRT - external beam radiotherapy, BT - brachytherapy, HDR - high dose rate brachytherapy, LDR - low dose rate brachytherapy, RR - Recurrence Rate, MDC - Median Time to Tumor Recurrence, OS - Overall Survival, MS - Median Survival
 • n.d. - no data, n.s. - no significant



Tumor visible during cholangioendoscopy

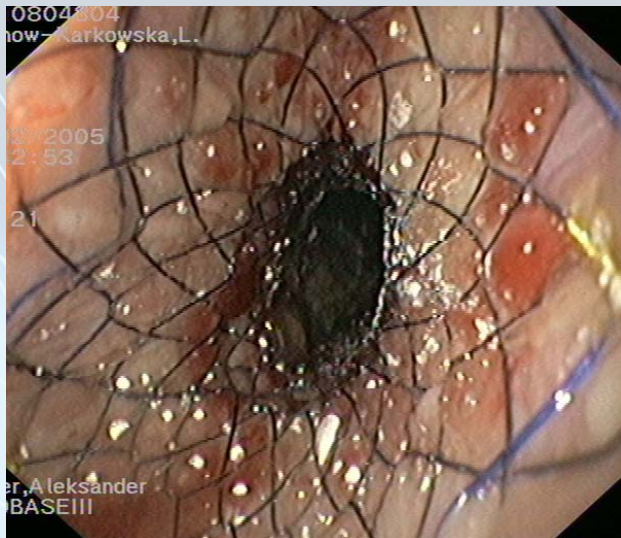


Tumor visible during cholangioendoscopy





Prothesis in bile duct



"Rendez – Vous,, - steps

1



US, location of gallbladder, bile ducts, upper abdomen status



"Rendez – Vous,, - steps

2



"Rendez – Vous,, - steps

3



Local analgesia



"Rendez – Vous,, - steps

4



X-ray, location of needle in bile ducts

"Rendez – Vous,, - steps

5



fluoroscopy, location of needle in bile ducts



"Rendez – Vous,, - steps

6



Preparing for guide-wire insertion in bile ducts

"Rendez – Vous,, - steps

7





"Rendez – Vous,, - steps

8



"Rendez – Vous,, - steps

9





"Rendez – Vous,, - steps

10



Guide-wire insertion in bile ducts

"Rendez – Vous,, - steps

11





"Rendez – Vous,, - steps

12



Fluoroscopy control of guide-wire insertion

"Rendez – Vous,, - steps

13





"Rendez – Vous,, - steps

14



Flexible catheter is inserted into the biliary tree to appropriate depths, under fluoroscopic control.

"Rendez – Vous,, - steps

15



8F catheter (or 10F) insertion in bile ducts



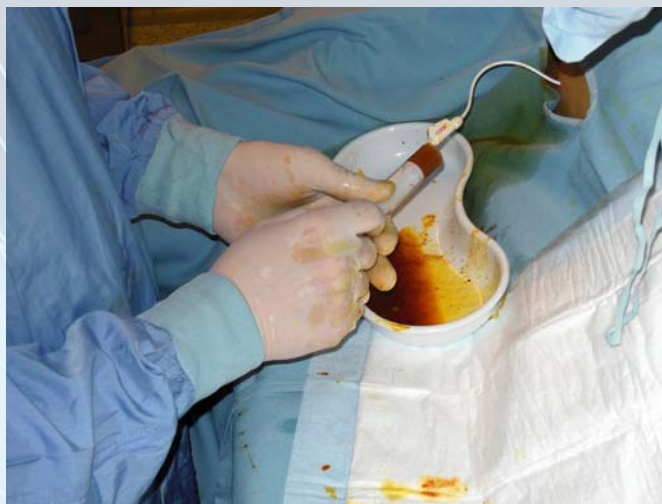
"Rendez – Vous,, - steps

16



"Rendez – Vous,, - steps

17



Drain patency check



"Rendez – Vous,, - steps

18



Rinsing

"Rendez – Vous,, - steps

19



Cholangography



"Rendez – Vous,, - steps

20



„Rendez-vous technique” - clip

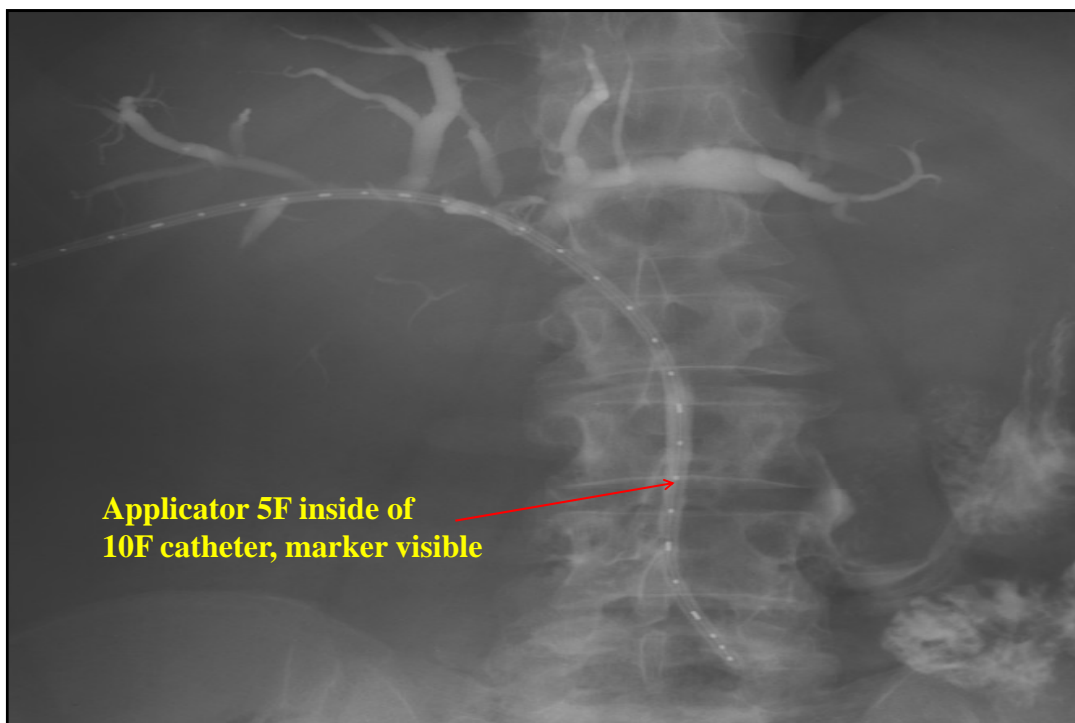


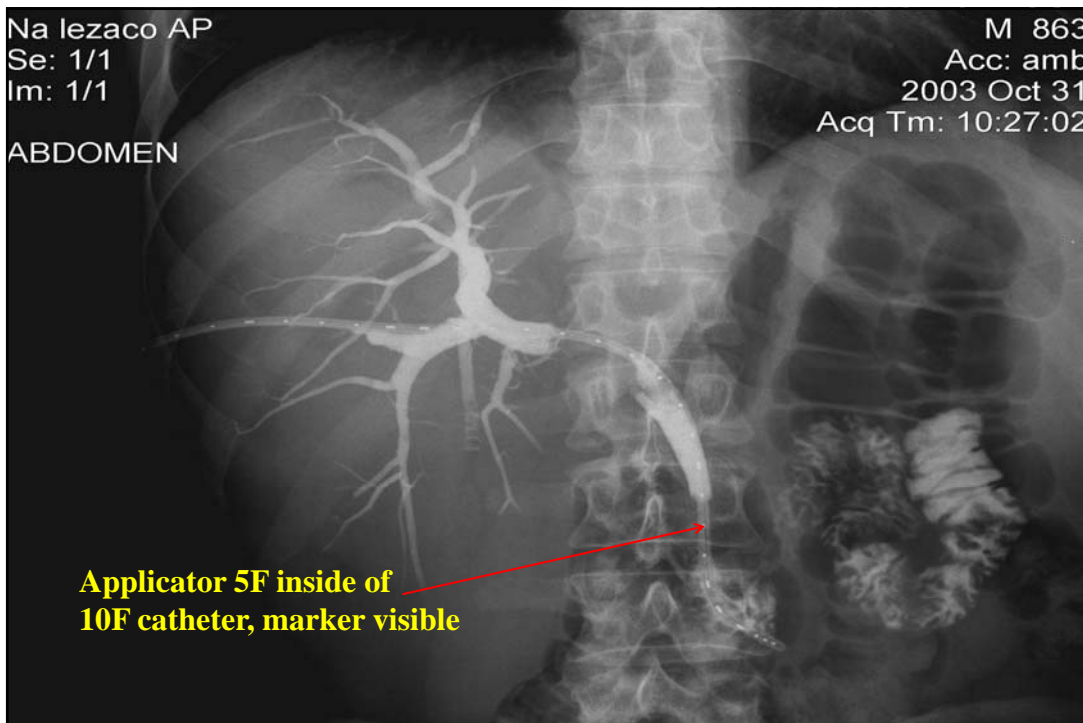
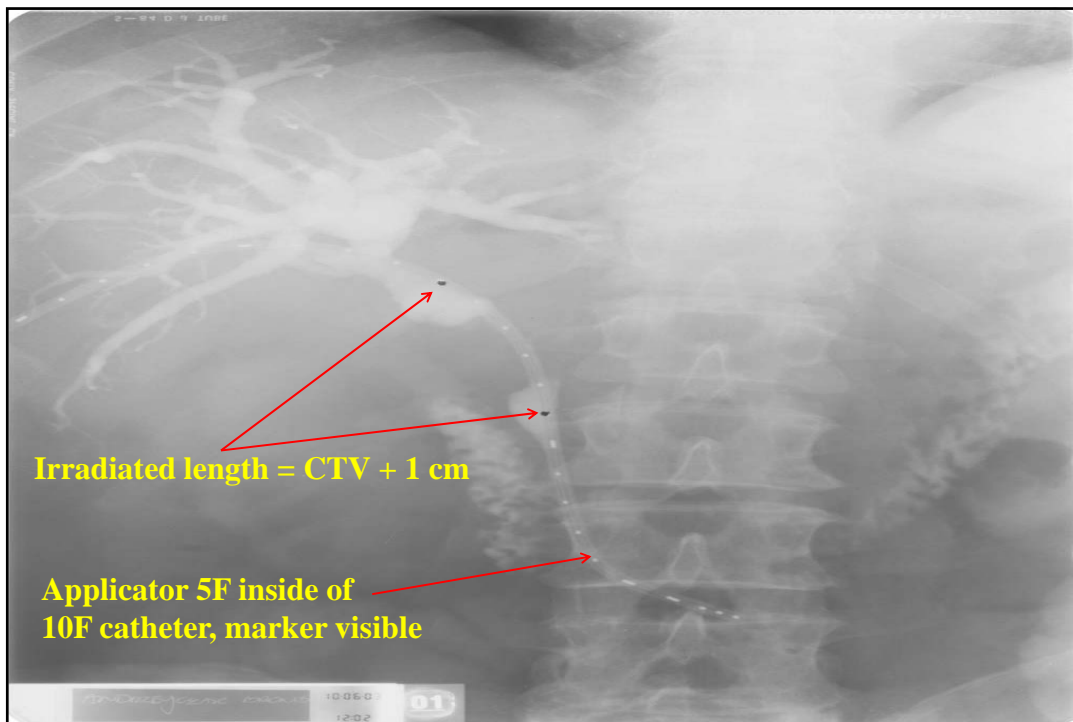


**French 5 catheter (dark blue) ready for brachytherapy,
inserted in 10 Ff catheter (light blue)**



**Applicator 5F inside of
10F catheter, marker visible**









Thank you

