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Srinivasan (1994) UK	Observational study (appears retrospective) 1982-1989	41 patients T3-4, Grade 2-3 TCC treated by palliative radiotherapy, presenting with haematuria and local pain	19 patients with reasonable PS (WHO grade ≤3) treated with conventional palliative treatment; 22 patients with poor performance status (WHO grade ≥4) accelerated radiotherapy. Mean age 78.4 years in 2-fraction group compared to 71.6 yrs in conventional group.	Conventional palliative treatment 4500cGy in 12 fractions over 26 days Both regimens used supervoltage photons. From 1984 volume was localised with CT.	Accelerated radiotherapy 1700cGy in 2 fractions over 3 days.	Not reported. Patients follow-up until death.	Clearance of haematuria: 59% (13/22) 2-fraction, 16% (3/19) conventional Improvement of pain: 73% (16/22) 2-fraction, 37% (7/19) conventional RT. Disease was fatal in all patients Overall survival: Mean 9.77 months 2-fraction vs 14.47 months conventional	No pain data for 7 patients. Time to symptom improvement not reported.																																								
Ligouri 2010 Italy	Case series 1997-2009	44 patients with intractable haematuria secondary to advanced pelvic tumour arising from or invading the bladder.	<table border="1"> <thead> <tr> <th></th> <th>N</th> </tr> </thead> <tbody> <tr> <td>Male</td> <td>30</td> </tr> <tr> <td>Female</td> <td>14</td> </tr> <tr> <td>Mean age</td> <td>79 (51-95)</td> </tr> <tr> <td>TCC bladder</td> <td>24</td> </tr> <tr> <td>prostate</td> <td>12</td> </tr> <tr> <td>uterus</td> <td>5</td> </tr> <tr> <td>vagina</td> <td>1</td> </tr> <tr> <td>rectum</td> <td>2</td> </tr> <tr> <td>kidney</td> <td>3</td> </tr> <tr> <td>Prostate and bladder</td> <td>2</td> </tr> <tr> <td>Prostate and kidney</td> <td>1</td> </tr> <tr> <td>Cystitis after RT</td> <td>1</td> </tr> <tr> <td>Cardiac history</td> <td>20 (51)</td> </tr> <tr> <td>Renal failure</td> <td>10 (26)</td> </tr> <tr> <td>Diabetes</td> <td>7 (18)</td> </tr> <tr> <td>cold</td> <td>6 (15)</td> </tr> <tr> <td>Hypertension</td> <td>9 (23)</td> </tr> <tr> <td>Peripheral vascular disease</td> <td>5 (13)</td> </tr> <tr> <td>Anaemia</td> <td>7 (18)</td> </tr> </tbody> </table>		N	Male	30	Female	14	Mean age	79 (51-95)	TCC bladder	24	prostate	12	uterus	5	vagina	1	rectum	2	kidney	3	Prostate and bladder	2	Prostate and kidney	1	Cystitis after RT	1	Cardiac history	20 (51)	Renal failure	10 (26)	Diabetes	7 (18)	cold	6 (15)	Hypertension	9 (23)	Peripheral vascular disease	5 (13)	Anaemia	7 (18)	Selective embolisation of internal iliac arteries. Simple measures to control bleeding by continuous irrigation using a 3-way catheter or cystodiathermy had been unsuccessful. All patients had complete coagulation profiles to exclude coagulopathy and perioperative antibiotic therapy. Used pre-curved Cobra or Simmons type 1 or 2 catheters and a hydrophilic guidewire. Artery embolised with unresorbable polyvinyl alcohol particles unless technically unfeasible. Sometimes to obtain more proximal occlusion, embolization was completed using	N/a	Mean 10.5 months (1-97)	Initial complete control of bleeding: 36/44 (82%) Permanent control of bleeding: at mean follow-up of 10.5 months 19/44 (43%). A second TAE session was required in 5 (11%) patients and it was successful in two of them. Requirement for transfusion: 24 (55%) required transfusion before TAE, 13 (30%) required more blood products after TAE Complications: No major complications over follow-up. Minor complications were post-embolization syndrome 12 (27%), fever (11%), gluteal pain (14%), nausea (2%), exterior	
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				impermanent embolic agents.			genital oedema (5%).	
El-Assmy 2007 Egypt	Case series 1998-2005	7 patients with advanced bladder cancer and intractable bladder haemorrhage who were unsuitable for surgical treatment.	6 male, 1 female. Mean age 61 (55-68). 6 patients had TCC, 1 patient had squamous cell carcinoma. All had conservative treatment before transcatheter arterial embolisation (TAE), including continuous bladder irrigation using a 3-way catheter and attempts to control bleeding endoscopically. 2 had palliative RT to control bleeding	Embolization of bilateral iliac arteries. Selective catheterisation of the internal iliac artery. Angiography used to test the success of the procedure. Embolized using platinum microcoils through 6F angiographic catheter. The procedure repeated on the opposite side using an ipsilateral or contralateral procedure.	n/a	Mean 10 months (6-12)	Immediate control of bleeding: 7/7 (100%) after mean 4 days Permanent control: at mean 10 months follow-up 4/7 (57%). Transfusion: 3 patients developed haematuria and required 2.1 transfusion units Complications: no significant complications related to embolization	
Nabi 2003 UK	Case series 1997-2001	6 patients with advanced pelvic malignancy and intractable haemorrhage	3 advanced bladder TCC, 3 advanced adenocarcinoma of prostate. Mean age 80 years (70-87) All had conservative treatment before TAE, including continuous bladder irrigation using a 3-way catheter and attempts to control bleeding endoscopically. 3 had palliative RT to control bleeding.	Bilateral internal iliac artery embolization. Iliac arteries were selectively catheterised using pre-curved catheters. Angiography used after embolization to ensure complete occlusion of blood flow. Embolized using tungsten/platinum coils, irrespective of whether bleeding was detected or not on angiographic study. The procedure repeated on the opposite side using an ipsilateral or contralateral procedure.	n/a	Mean 22 months (10-60)	Immediate control of bleeding: 5/6 (83%). 1 patient the bleeding was successfully embolised at a second attempt. Permanent control of bleeding: 6/6 (100%) at mean 22 months follow-up. Transfusion: no patient required transfusion after TAE or emergency admissions for control of haematuria. Complications: No major complications. Minor complications – nausea, fever and vomiting (n=3, 50%).	
Jenkins 1996	Case series	10 patients with life	Mean age 73 years (58-85). 7 bladder TCC, 1 carcinoma of cervix, 1	Bilateral internal iliac artery embolisation. Iliac	n/a	Patients followed	Initial control of bleeding: 9/10 (90%). In 5/9 patients	

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UK	1979-1992	threatening haematuria secondary to inoperable pelvic carcinoma arising from or invading the bladder	rectum, 1 sigmoid colon.	arteries were catheterised and embolic material discharged into anterior divisions or the main stems of the internal iliac arteries if the interior divisions could not be easily catheterised or branched very close to their origins. Occlusion of vessels was assessed by repeated small injections of contrast.		until death.	<p>surviving more than 24h there was complete control of haematuria lasting until patient's death.</p> <p>Requirement for transfusion: 2 patients required blood transfusion when haematuria recurred after 5 and 1.4 months.</p> <p>Complications: One patient died from septic shock. 3 patients developed mod buttock and thigh pain lasting max of 3 days.</p> <p>Treatment related mortality: 4 patients died within 2 wks. 1 patient who did not receive prophylactic antibiotics died of septic shock 12h later. 3 patients deaths attributed to tumour not haematuria.</p>	
Mantadakis 2003 Greece	Prospective observational study	32 patients with advanced bladder carcinoma. Unfit for or refused surgery with adequate bone marrow and renal	<p>30 male, 2 female. Median age 68 yrs (range 47-85). 14 T3N0M0, 10 T4N0M0, 4 T4N1M0, 4T4NxM0. 29 pure TCC.</p> <p>All patients had gross haematuria prior to RIAC. 7 had diversion of a dilated urinary tract prior to RIAC</p>	<p>Regional intra-arterial chemotherapy (RIAC). Epirubicin 10mg over 2 hrs on each internal iliac artery on the 1st – 3rd day of each chemo (total 60mg epirubicin per cycle). Systemic chemo i.v. leucovorin 200mg over 2hrs and 5FU 750mg per day on 1st through 3rd day</p>	n/a	NR	<p>Control of bleeding: 24/32 had resolution of gross haematuria. Persisted in 8 patients.</p> <p>Treatment-related morbidity: no hemorrhagic, thrombotic or embolic complications. One UTI, one acute tubular necrosis, one mild alopecia. No nausea or</p>	

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		function. Distant mets excluded		of each cycle. Cycle repeated every 21 days. All patients completed chemo, median 4 cycles per patient (range 1-6).			emesis. 8 G1 leukopenia, 6 G1 mucositis, one G3 mucositis, 4 G1 diarrhea, 3 G1 thrombocytopenia.	
LacARRIERE 2013 France	Retrospective observational study 1993-2009	32 bladder cancer patients unfit for surgery due to age or medical comorbidities	<p>Patients with gross haematuria from bladder cancer, unfit for surgery, no previous pelvic radiotherapy. Coagulation disorders excluded.</p> <p>Mean age 81 (range 65-93)y. 20 male, 12 female. ECOG PS 2.5 (range 1-4).</p> <p>22% Ta-T1, 38% T2, 19% T3, 22% T4, 91% G3</p> <p>16 (50%) N+, 11 (34%) M+.</p> <p>Group A younger and lower PS and fewer comorbidities than Group B.</p>	<p>External radiotherapy using high energy photon therapy, with 4 orthogonal beams. Clinical target volume was the bladder. Lymph nodes not considered for treatment in palliative setting.</p> <p>Protocols dependant on general health of patient. Protocol A (n=13): 30Gy in 10 fractions over 2 weeks if ECOG PS ≤2.</p>	Protocol B (n=19): Hypofractionated 20Gy in 5 fractions for 1 week if ECOG PS >2.	Mean 25mo (range 7-42)	<p>CTC AE used to evaluate intensity of haematuria. 22 (69%) presented no haematuria after 2 weeks. 7 (54%) group A no haematuria vs. 15 (79%) Group B (p=0.139).</p> <p>Relapse defined as presence of gross haematuria during evaluation or need for other procedures to achieve hemostasis. After 6 months 69% of all patients had relapsed, with no difference in tumour subgroup or by ECOG PS.</p>	40 patients enrolled, 8 excluded