Cystectomy

Last Updated Friday, 14 November 2008

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Online booklets from the NHS:

Cystectomy for men-ileal conduit/urostomy

Cystectomy for women-ileal conduit/urostomy

Bladder Reconstruction-Continent diversion/Indiana type pouch (internal)

Bladder Reconstruction-Neobladder

2004:European Urology Ass.: Management Guidelines on muscle-invasive and metatastic bladder cancer

Old friends, new ways: revisiting extended lymphadenectomy and neoadjuvant chemotherapy to improve outcomes. Current Opinion in Urology. 14(5):251-257, September 2004. Busby, J Erik; Evans, Christopher P

Summary: Extended lymphadenectomy has consistently shown benefit with minimal morbidity and should be considered - especially in cystectomy patients that are T3. The results from neoadjuvant chemotherapy are more modest. Further studies await further elucidation to confirm this. Abstract

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On this page:

statistics - replacing the bladder-techiniques - survival advantage with lymph node removal - follow up care - risks/complications

types of resections used: [gastro, ileal, jejunal, colonic] further reading - Must Read online articles; organizations

Cystectomy May Be Best Option for Some Bladder Cancer Patients

Study Finds the Earlier, the Better: article below

Potential metabolic complications of continent urinary diversion: Loss of bowel and urine contact with bowel pose risks that need to be considered by doctor and patient: see below

For a list of pre and post operative questions click here

For a collection of post-operative survival tips from those who've been there, click here.

Many patients with aggressive clinically superficial bladder cancer ultimately die of their cancer, due in part to resistance to undergo radical cystectomy. With the alternative of orthotopic urinary diversion available to most men and women requiring cystectomy, radical cystectomy should be considered a viable alternative to continued conservative measures for selected patients with aggressive superficial bladder tumors.1

The American Cancer society projects that bladder cancer will be diagnosed in 54,400 Americans (1998 statistics); 12,500 deaths (8,400 men and 4,100 women). It is the 8th leading cause of cancer and tenth leading cause of death in women, fourth and seventh respectively for men.

Survival statistics

Long term survival is directly related to the stage of the tumor(s) upon bladder removal. A 2001) study from USC/Norris Cancer Center reviewed the survival rates of 1,054 cystectomy patients; the following graph shows the various stages+mean survival rates. Although some people also received chemo and/or radiation, this is not taken into account in the following statistics:

stage of cystectomy specimen
5yr survival
10 yr survival

P0
92%
85%

Tis
91%
89%

Pa
79%
74%

P1
83%
78%

P2
89%
87%

P3
78%
76%

P3b
62%
61%

P4
50%
45%

lymph node positive
35%
34%

Patients could be further stratified by the number of lymph nodes involved and by the P-stage, those with fewer than five positive lymph nodes, and whose P-stage was organ-confined (less than P2) had significantly improved survival rates. Bladder cancer recurred in 30%. These data from a large group of patients support the aggressive surgical management of invasive bladder cancer. Excellent long-term survival can be achieved with a low incidence of pelvic recurrence. 8

*Update 2006: Cystectomy for transitional cell carcinoma of the bladder: results of a surgery only series in the neobladder era Hautmann RE, Gschwend JE, de Petriconi RC, Kron M, Volkmer BG J Urol 2006; 176:486-92; discussion 491-2.

This article gives the following statistics: The rate of recurrence-free survival at 5 years was 82.5% for pT2a pN0, 61.9% for pT2b and pT3a pN0, and 53.1% for pT3b pN0 disease. The most dramatic impact on survival apart from nodal invasion or metastatic disease was progression from T2a to T2b disease. *

When the bladder is removed, the doctor will need to make a way to store and pass urine. Depending on the person's anatomy, the doctor may use part of the small intestine to make a tube through which urine will pass out of the body through an opening or stoma, on the outside of the body, this is called ostomy or urostomy. Urostomy requires one to wear a special bag to collect urine.2 The disposable bag sticks to the skin around the stoma. The bags do not show under clothing and most can care for these bags themselves.

The doctor may also use part of your small intestine to make a continent reservoir (storage pouch) inside the body to collect urine. The urine is drained through a stoma using a catheter.

Stomas are openings in the abdomen which allow drainage of bodily wastes after ostomy [urostomy or colostomy] surgery, they are usually made of intestine, have little or no feeling and produce mucous. see also: stomas and ileal conduits here at WebCafe.

In women, radical cystectomies usually involve the removal of the whole bladder, the urethra, the lower end of the ureters, the front wall of the vagina, the womb (hysterectomy), fallopian tubes and ovaries. In younger women the ovaries may be preserved. As a result the vagina will be shorter and narrower following the operation. In men the whole of the bladder, the prostate gland, the lower ends of the ureters and sometimes the urethra is removed.4

It is sometimes impossible to avoid damage to the nerves in the pelvis with the result that men will be unable to achieve an erection and sexual feeling and orgasm (climax) may be impossible for both male and female patents. In some men inability to obtain and erection can be helped by an injection or an operation (see also WebCafe's: impotence guide).

If you have a partner it may be very helpful for them to see the specialist with you - if possible before the operation is performed. The operation of cystectomy is extensive and removes most of the organs in the pelvis, but this is done to keep the risk of cancer recurrence as low as possible.

Replacing the bladder

Urostomy/Ileal conduit: If the bladder has been completely removed a new reservoir for the urine will have to be created. The most common method is by the formation of an ileal conduit or urostomy. A small section of the bowel is used to join the ureters from the kidney to the skin of the abdominal wall. The remaining bowel is joined together again. The opening or stoma or urostomy drains the urine into a flat, changeable, a watertight bag, which is attached to the side of your abdomen. This will fill up in the same way as your bladder did and will need to be emptied regularly by a small tap on the bottom of the bag.5

Continent pouch or reservoir: If the urethra has to be removed, a continent pouch can be formed, again using a piece of bowel. Although you do not pass urine out through the urethra, you do not have to wear a bag. Instead you will be taught how to drain the urine by passing a small catheter into the new bladder. 6

Orthotopic Neobladders: Under certain circumstances, newer methods may be used which take parts of the small intestine to make a new pouch that is connected to the remaining part of the urethra (if it has not been removed). Urine passes out of the body through the urethra and a stoma is not necessary.3 It may be possible to empty the bladder normally, but you may have to learn to use a small tube (catheter) to drain the urine several times a day.

In select women who are candidates for a neobladder, it is possible to preserve the anterior vaginal wall and urethra.

See also: Internal Pouches Neobladders Neobladders For Women

These operations are all major, complex procedures. If your urologist feels that the best course of treatment for your bladder cancer is one of these options, he should discuss it in detail with you, and where appropriate your partner or family. There are specialist nurses who will advise and help you before and after your operation, who will teach you to look after your urostomy, bladder or pouch, work with your physician and nurses at home, visit you after you leave hospital if possible and see you in clinic regularly afterwards. They will be able to introduce you to someone who has already had your operation so that you can find out how other people cope, and give you information on support groups in your area. 7

Survival advantage with lymph node removal

Removal of pelvic lymph nodes in patients undergoing an attempted curative cystectomy improves long-term survival.

Debate exists whether a surgeon should proceed with radical cystectomy if the pelvic lymph nodes are found to have disease. While nodal spread clearly portends a poor prognosis, recent data from MSKCC suggest that a subset of patients with positive nodal disease can achieve long term (>10 years) survival when radical cystectomy is combined with a thorough pelvic lymph node dissection and adjuvant therapies. To read the study abstract, click here

Pelvic lymph nodes are one of the first sites to which bladder cancer spreads. However, through current detection methods, small amounts of lymph node involvement are often not detected. Thus, many physicians may not remove lymph nodes at the time of cystectomy. These remaining cancer cells are responsible for cancer recurrences following surgery and can travel further throughout the body.

Recently, physicians from Switzerland assessed data and outcomes of 452 patients with bladder cancer treated between 1984 and 1997. Although all patients had undetectable lymph node involvement prior to cystectomy, all had their pelvic lymph nodes removed. Laboratory analysis showed that nearly 20% of these patients had cancer that had spread to the lymph nodes. Five years following surgery, approximately 30% of patients that had spread to the lymph nodes were still alive. Patients with 5 or fewer involved lymph nodes, no spread of cancer outside the lymph node wall and small amounts of cancer cells in their lymph nodes had significantly improved outcomes over those with more spread. Patients with TCC may wish to speak with their physician about the risks and benefits of pelvic nodal removal at the time of cystectomy.

To access the study abstract on Pub Med, click here

Follow Up Care

Because a significant risk of recurrence exists following radical cystectomy, frequent and appropriate surveillance is essential.

MD Anderson Cancer Center retrospectively reviewed the post–radical cystectomy surveillance protocol for 382 patients and concluded that a stage-specific approach was most appropriate, meaning the higher the T-stage at diagnosis, the greater the risk of recurrence within 2 years. With median follow-up of 38 months, 97 of 382 (25%) patients had recurrences, with median time to recurrence of 12 months. The 4 most common sites of recurrence (in decreasing order of incidence) were lung, pelvis, bone, and liver. Seventy-four percent of recurrences were asymptomatic, and 43 of the 72 asymptomatic recurrences were detected by chest x-ray or liver function serum tests.

Only 5% of patients with pT1 disease had subsequent metastases, and all were identified by chest x-ray or liver function tests. Among 10 patients who were found to have asymptomatic intraabdominal recurrences by CT scan, 9 had pT3 disease. Patients with pT2 and pT3 disease had recurrence rates of 20% and 40%, respectively. All recurrences in patients with pT2 or pT3 disease occurred within 24 months.

Patients with pT1 disease: annual history, physical examination, chest x-ray, liver function tests, and alkaline phosphatase levels.

Patients with pT2 disease should have the same studies, but they should be performed every 6 months for 3 years, then annually.

Patients with pT3 disease should be followed similarly to those with pT2 disease, except surveillance starts at 3 months, with CT scans at 6, 12, and 24 months.

All patients with TCC should have upper tract radiographic studies every 1-2 years.

Cystectomy May Be Best Option for Some Bladder Cancer Patients

Study Finds the Earlier, the Better

Patients with superficial bladder tumors may benefit from removal of the bladder within the first year of therapy, rather than opting for bladder-sparing surgery and chemotherapy, say researchers at Memorial Sloan-Kettering Cancer Center.

Superficial bladder tumors are ones that have not invaded the muscular wall of the bladder. In the October Journal of Urology, (Vol. 58, No. 3: 376-379), researchers suggest that in certain clinical situations, the earlier the bladder is removed (a procedure called a cystectomy) the better the patient's survival.

Deciding when to remove a patient's bladder can be a difficult decision for both patient and urologist, says Harry W. Herr, MD, lead author of the study.

Herr says some believe that bladder removal is a “terrible operation. That's no longer the truth.” The patient’s “quality of life is much better now with the newer orthotopic diversions (bladder reconstruction)," he says. Herr does qualify his point by saying that this is true when the surgery and reconstruction are placed in the hands of highly experienced surgeons.

"Cystectomy is not something that should be used as a last resort, but should be used to cure patients," Herr says.

Herr and co-author Pramod C. Sogani, MD, reviewed the charts of 307 patients from 1979 to 1984 who underwent a complete transurethral resection for bladder cancer. These patients all had superficial bladder cancers, where the visible cancer could be removed through a scope passed through the urethra and into the bladder. The bladder itself did not have to be removed as part of the initial treatment for these patients.

After the resection surgery, these patients were treated with one of more courses of bacillus Calmette-Guerin (BCG) therapy. BCG is a treatment with a bacteria instilled into the bladder that is effective in preventing or delaying recurrence of cancer in patients with this type of superficial bladder cancer.

Ninety of the 307 patients treated in this manner eventually underwent cystectomy for recurrent tumors during the 15- to 20-year follow-up period. Forty-four of these patients (49%) survived a median of 96 months (median means half of the patients survived less than 96 months, and half survived more than 96 months).

When counting from the time of cystectomy, 48 patients had their bladders removed within two years of BCG therapy and 42 patients after two years. Of the patients who had their bladders removed within the two-year time frame, 69% were alive at 15 years, compared to 26% of the group who had the delayed surgery.

Earlier Surgery Is Best in Many Situations

For those patients who only had superficial relapse when their bladders were removed, their survival rate was 92% at 15 years, compared to 56% who had their surgery after two-year follow-up.

For patients whose cancer had invaded surrounding muscle tissue when their bladders were removed, again the earlier surgery proved better with 41% surviving compared to 18% with the later surgery.

The survival rate for patients who underwent bladder removal was shown to be better the earlier it was done after BCG

failure for each category the researchers examined.

Which Patients Will Most Benefit From Earlier Surgery?

"To me, the basic tenets espoused by this paper tend to be observed by a lot of urologists already,” Fray F. Marshall, MD, of Emory University tells ACS News Today. “But this supports the notion that if you treat something topically and superficially and it doesn't go away or it advances, then you clearly have a higher risk and a clear option to take the bladder out. “I think everybody kind of agrees with that, but not everybody wants their bladder out and older patients may not withstand the surgery very well," Marshall says.

In an accompanying editorial commentary, Joseph A. Smith Jr, MD, at Vanderbilt University Medical Center in Nashville, Tenn., says that the rhetorical question posed by the study is whether performing cystectomy before it progresses to and is detected at a higher disease stage is the preferable course of action.

However, good prognostic markers, both Smith and the study authors say, are needed determine when to do a cystectomy.

Adds Marshall, "There is not an absolute answer to the individual patient's problems with bladder cancer. Management and treatment should be highly individualized."

On a positive note, Smith points out that in the study conducted at Memorial Sloan-Kettering 217 patients did not require cystectomy. BCG therapy is well established for decreasing the risk of tumor recurrence in some patients.

In fact, Marshall says, other researchers have shown that there is a reasonable response rate for some patients to a second course of BCG. If they fail that the options become a little more uncertain.

Marshall points to an Emory University study looking at BCG plus interferon. “While it's not 99% effective, the patients that respond do pretty well and they may very well have avoided cystectomy," he says.

Marshall cautions against the mindset that if a patient fails one course of BCG, it's immediately on to cystectomy.

But Herr is convinced. "It is clear to us that if you persist with conservative management beyond six months to a year, it is too late. Our stance here is that we clearly operate too late," he says.

Potential metabolic complications of continent urinary diversion

Contemporary Urology® Archive May 2001 By Robert D. Mills, MD, and Urs E. Studer, MD

The 2 main considerations in complications caused by the loss of bowel are the type and length of bowel lost.

Most complications result from either the bowel's contact with urine or the loss of bowel absorptive area. Complications caused by urine contact with bowel depend mainly on the type and length of bowel used, the constituents of the urine, and the contact time.

Metabolic status, especially blood gas analysis, should be determined early in the presence of nonspecific illness.

Potential complications include

*Bone disease: Demineralization (long-term); Reduced growth (young patients); Increased fracture rate; Pain in weight-bearing joints.

Significant bone changes are unlikely to be seen before 15 to 20 years postoperatively. It would be prudent, however, to monitor acid-base status closely, particularly in those patients at increased risk (including young patients with a long life expectancy and patients with preexisting renal disease). Although compliance may be a problem, authorities have recommended that patients with a base excess persisting below -2.5 mmol/L should take oral bicarbonate supplements.6

*Vitamin B12 deficiency (including peripheral neuropathy, optic atrophy, dementia, and spinal cord degeneration) and may be irreversible.

*Increase in the incidence of renal calculi (kidney stones)

*Hyperchloremic acidosis (Treatment in the acute stage consists of catheter drainage of the reservoir and saline infusion. Acidosis may be corrected with sodium bicarbonate, which may be continued over the long term, if necessary). Management Hyperchloremic: metabolic acidosis is managed with alkalizing agents, either with or without blockers of chloride transport. Sodium bicarbonate effectively corrects acid-base status; however, intestinal gas formation may be a problem. Furthermore, the correct dose is not always easy to determine. Sodium citrate, an alternative, has an unpleasant taste, leading to compliance problems. Sodium supplements may increase blood pressure or cause fluid retention and pulmonary edema in patients who are at risk. The dose of alkalizing agent may be reduced by combining it with nicotinic acid or chlorpromazine, which act through inhibition of cyclic adenosine monophosphate, thereby impeding chloride transport.

Although these agents alone will not correct acidosis, they can alleviate the situation. Alternatively, potassium citrate may be more appropriate, since a relative depletion of total body potassium in many such patients may be exacerbated by the addition of sodium supplements.

Acid-base status should be monitored regularly in patients with continent urinary diversions, particularly during the early postoperative period, until a stable situation is reached.

Suspicious symptoms

The clinician should maintain a high index of suspicion in a patient who develops nonspecific illness with fatigue and vomiting after urinary diversion. Acidosis and electrolyte disturbance should be excluded at the outset, including measurement of the base excess, since the presence of normal serum pH and bicarbonate does not preclude a compensated acidosis.

Patients with kidney impairment (creatinine >200 µmol/L) and, therefore, a reduced capacity to compensate for acidosis should undergo ileal conduit rather than continent diversion. Similarly, those who are not prepared to pursue regular follow-up should not undergo continent reservoir formation.

Types of resections used

Gastric resection (use of stomach tissue in creating the reservoir)-this is not a commonly used approach

A deficiency of vitamin B12, which may take many years to develop, has not been reported after use of the stomach for continent diversion. However, ulceration in a gastric pouch may occur. Management using H2-receptor antagonists or proton pump in-hibitors is aimed at maintaining the pouch at a pH of 4 or higher. While long-term follow-up of gastric reservoirs is awaited, the theoretical risk of bone demineralization, as has been reported after partial gastrectomy, remains.1 Osteomalacia and osteoporosis may coexist or may be found in isolation.

Jejunal resection- In the presence of healthy bowel, jejunal resection does not pose a problem, since longer lengths than are needed for the construction of a reservoir would have to be resected before malabsorptive syndromes could develop.

Urine contact results in a salt loss syndrome that includes dehydration, hyponatremia, hypochloremia, hyperkalemia, and metabolic acidosis. The more proximal the jejunum, the more severe the metabolic disturbance. In practice, therefore, the jejunum cannot be used for continent urinary diversion.

Possible metabolic complications such as loss of bile acids, altered lipid metabolism, iIncreased incidence of renal calculi, vitamin B12 deficiency (terminal ileum) with potentially irreversible complications, and significant diarrhea and malabsorptive complications make jejunum unsuitable for reservoirs.

Ileal resection -The consequences of ileal resection are most easily categorized according to the length resected. In the presence of a normal terminal ileum and ileocecal valve, up to 60 cm of ileum may be resected without inducing significant malabsorptive consequences. We do not recommend a total loss of ileum exceeding 60 cm. Resection of 60 to 100 cm results in the loss of bile acids above the normal daily amount.

Hepatic compensation prevents lipid malabsorption. The cathartic action of bile acids in the colon may cause diarrhea; this may be treated with anion exchange resins, which bind bile acids. However, these resins are generally used only for short-term treatment because they interfere substantially with the absorption of other drugs.

Altered lipid metabolism has been reported in patients who have undergone ileal resections of more than 60 cm.2 Serum cholesterol falls in linear proportion to the length of ileum resected, with a corresponding rise in triglycerides.2 Any long-term effects of altered lipid metabolism as aresult of bowel resection are unknown.

Resection of more than 100 cm of ileum should not be necessary for reservoir formation alone. Continent diversion with an ileal pouch should be avoided if the final loss, including the loss from a prior resection, would total 100 cm or more. Otherwise, lipid malabsorption would occur even in the presence of normal terminal ileum and an ileocecal valve. This is because hepatic production of bile acids would not be able to keep pace with the rate of loss, resulting in mainly steatorrheic diarrhea.3 The bowel lengths described here should be considered guidelines rather than absolutes, because tolerable resection lengths vary from one individual to another.

Lipid malabsorption following ileal resection also results in a theoretic increase in the incidence of renal calculi. Because unabsorbed fats bind calcium, less calcium becomes available to form poorly soluble calcium oxalate in the intestinal lumen. More soluble oxalate salts form and are absorbed in the colon. Oral calcium citrate may be given to bind the oxalate. Other factors not directly related to the resection, such as dehydration, hypercalciuria, hypocitruria, and hypersulfaturia, may also increase the risk of stone formation.

We believe that terminal ileal resection should be avoided, if possible, because this region is particularly important for the absorption of vitamin B12 and bile acids. A significant depletion of vitamin B12 levels has been reported at 4 years post Mainz pouch I, a technique that involves the use of the distal 24 to 36 cm of ileum and 12 cm of ascending colon.4

If terminal ileum is resected, lifelong follow-up is required, as the neurologic sequelae of vitamin B12 deficiency (including peripheral neuropathy, optic atrophy, dementia, and spinal cord degeneration) may be irreversible.

leocecal valve resection in conjunction with small bowel resection results in a significant increase in diarrhea and malabsorptive complications compared with small bowel resection alone. The ileocecal valve has a role in increasing small bowel transit time and preventing the reflux of colonic contents, with a subsequent proliferation of bacteria in the ileum. We therefore recommend preserving the ileocecal valve when possible.

Hyperchloremic acidosis, which is commonly seen with colonic reservoirs (see below), may also exist in conjunction with ileal reservoirs. Mild metabolic acidosis occurs in up to 15% of patients who have ileal conduits. Up to 10% of these require treatment.6 The increased contact time in up to 50% of patients with ileal continent diversions may lead to metabolic complications.7 This risk increases with increased surface area of the reservoir. A balance must, therefore, be struck between reservoir capacity and the anticipated severity of metabolic complications. We find reservoirs constructed from approximately 60 cm of ileum to be optimal.

Colonic resection - The resection of colonic segments for use in continent diversion does not usually result in malabsorptive sequelae. The rightside of the colon is, however, particularly important in patients who have undergone ileal resection. The colon has a large reserve capacity for absorbing water (up to 6L) and sodium (800 mEq). Diarrhea may be very severe if both ileum and right colon are resected.5 It therefore seems safer to avoid contiguous colonic and distal ileal resection for continent urinary reservoir formation. If both are resected, the clinician should consider ileocecal valve reconstruction, a procedure that has been shown to decrease stool frequency.5

Hyperchloremic acidosis commonly develops in patients with colonic reservoirs. Historically, the highest incidence of hyperchloremic acidosis was seen with ureterosigmoidostomy. On close scruitiny, almost all patients have at least a mild degree of acidosis.8

References below for article: Potential metabolic complications of continent urinary diversion Contemporary Urology® Archive May 2001 By Robert D. Mills, MD, and Urs E. Studer, MD

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Further Reading

http://www.emedicine.com/med/topic3061.htm Professional site, current, state of the art info; Cystectomy, Radical

http://www.moffitt.usf.edu/pubs/ccj/v3n6/a4.html A very informative article from the Moffit Cancer Control Journal; Bladder Replacement and Urinary Diversion After Radical Cystectomy, with photos of surgery procedure (beware!), from 2001.

A newer article is also excellent: Surgical Management of Bladder Cancer (2002), found by going to http://www.moffitt.usf.edu/pubs/ccj/ and clicking on the July/Aug 2002 issue over geniturinary malignancies to bring up the article in pdf format. For a WWW version see: http://professional.cancerconsultants.com/ccj_bladder.aspx?id=23529

http://alumnus.caltech.edu/~pls/kock/ Info about Kock pouches, with photos, as well as a few surgeon's names who are qualified to do the procedure.

http://www.duj.com/Article/girgin.html Comparisons of three types of continent urinary diversions, the Kock pouch, the Koch neobladder and the Mainz pouch, including risks and benefits.

See also: Ostomy Resources

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