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Title: Influence of the level of sacrectomy and internal iliac node resection on survival in patients with recurrent colorectal cancer

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#### Introduction:

Colorectal cancer (CRC) is a common and often lethal cancer of the colon or rectum. CRC is New Zealand's second most common registered cancer and second largest cause of cancer deaths. The definitive treatment for CRC is surgery often combined with radiotherapy and/or chemotherapy. Despite intensive treatments many patients will have recurrence of the cancer. Unlike other cancers rectal CRC reoccurs locally and invades adjacent organs while other cancers often spread throughout the body. As with the primary cancer the recurrence is treated with surgical excision, to have a chance of cure all of the cancer must be removed. Complete removal of the cancer often involves removal of adjacent organs which the cancer has invaded. One such structure is the sacrum. The sacrum consists of 5 fused vertebrae at the end of the spine terminating in the coccyx or "tailbone". Surgical removal of a sacrum invaded by cancer has its own challenges depending on which level of the sacrum is invaded by cancer. If the cancer has invaded high up into the sacrum more bone needs to be removed making for a longer and more complex operation. Furthermore this bone provides important structural stability for the pelvis as well as protection of the nerves associated with it. Lower invasion of the sacrum is less complex as the bone itself is much smaller and does not serve a critical structural role or contain important nerves like the high sacrum. Due to the complex structure and function of the high sacrum the operations are not only longer but have more complications and a longer recovery time. As with any operation it is a case of balancing risks and benefits. The quantifiable survival benefit of a high sacrectomy is unclear. There is some concern that high sacrectomies may be too radical and do more harm than good, especially when compared to the less radical low sacrectomies.

#### Aim:

To determine if high sacrectomies have comparable survival outcomes to low sacrectomies in the treatment of recurrent CRC.

#### Impact:

High sacrectomies are used for the treatment of recurrent colorectal cancer in attempt to provide increased survival and cure. If the data gathered does not support a strong survival benefit for high sacrectomies compared to low sacrectomies then the use of high sacrectomies may need more careful consideration from both the patient and surgeon. This will likely mean less patients will undergo a sacrectomy if a high sacrectomy is needed to ensure complete cancer removal.

#### Method:

Data from 280 patients was gathered from Christchurch Public Hospital, The Royal Prince Alfred Hospital (Sydney) and The Royal Marsden Hospital (England). This data was collected

retrospectively from databases and the records of patients who have received a sacrectomy as part of surgical treatment for recurrent colorectal cancer.

#### Results:

Patients who had a high sacrectomy had a median survival of 2.6 years compared with the 1.6 years survival of patients who received a low sacrectomy. A survival curve analysis similarly showed greater survival of patients who received high sacrectomies of approximately 10% higher survival. However neither of these differences were statistically significant and thus no significant survival difference can be said to exist between high or low sacrectomies. Despite this being a statistically insignificant finding it is a comforting result. As it tells us that the more intensive high sacrectomy operation still confers the same survival benefit as the less radical low sacrectomy. All other variables except one included in this analysis were comparable between the two groups this included length of hospital stay, tumor resection grades and survival based on resection grade received. The only variable that was different between the two groups was complication percentages. Major complications in the 30 day window following surgery occurred in 18% of low sacrectomies and 43% of high sacrectomies. Similar results have been previously reported in other publications regarding sacrectomy operations and thus was not entirely unexpected. Furthermore the high rate of complications seem to have little effect on overall survival, suggesting these complications are being adequately managed in both groups.

#### Conclusion:

Looking to the future as high sacrectomies are shown to provide a similar survival benefit to low sacrectomies they can continue to be offered to suitable patients with the intent of curing the disease. Two important areas for further research are outcome prediction and quality of life. As more information becomes available guidelines can be developed to better predict and avoid negative outcomes. Quality of life although not touched on directly in this study is a key factor when considering any major operation. Studies evaluating the quality of life experienced by patients following these operations will be very important when considering to undergo the operation or not. Hopefully the quality of life observed in future studies will mimic the success of the survival benefit observed in this study.