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RETROPERITONEAL SARCOMA

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Abstract

Retroperitoneal sarcoma (RPS) is a rare tumour. Its management is challenging because of often late presentation when the tumour attain a significant size, and its close relationship to several vital organs and structures in the retroperitoneum. Although surgery remains the main hope in controlling the disease, the use of neoadjuvant or adjuvant radiotherapy and/or chemotherapy remains controversial. Local recurrence is high and there are reports of successful second and third resections after recurrence.

In this report the author reports two cases recently he had managed and presents the unique CT scan findings of the first case. This is followed by a brief review of the important matters related to this tumour.

Introduction

Retroperitoneal sarcoma is a rare tumour arising from mesenchymal tissue. It account for approximately 10-15% of all soft tissue tumours and less than 1% of all malignant neoplasms[1,2]. The common histologic types are liposarcoma, leiomyosarcoma and malignant fibrous histiocytoma[2].

Retroperitoneal sarcoma (RPS) has a pattern of presentation and biologic behavior which is different from that of soft tissue sarcoma of the extremity[3]. Due to minimal early symptoms, diagnosis often reached when the tumour is large and may involve surrounding organs / structures. It was found that patients who were complaining for a long time without having a diagnosis will have worse prognosis and a shorter recurrence-free survival[4].

The presentation of the two cases is followed by a discussion of: 1- Surgical treatment, its extent and factors related to recurrence. 2- Rate and approaches to recurrences and 3- Multimodality treatment in the form of radiotherapy and/or chemotherapy.

Case one

A 59 year old female patient previously healthy and fit presented to her General Practitioner (GP) with left sided abdominal pain without any associated other symptoms related to any particular system. The GP thought that there is a palpable swelling in the left upper part of the abdomen. An ultrasound scan revealed the presence of a large mass, and a CT scan showed a huge mass extending from the left dome of the diaphragm down to the upper border of the left side of the pelvis (Figures 1-5). It is partly inhomogeneous, pushing the spleen and pancreas upwards & anteriorly and the left kidney downwards & anteriorly. It seems to be abutting to part of the abdominal aorta but not directly involving it, and not involving other organs or structures. The left suprarenal gland was not seen. In addition multiple lesions were seen in the liver and there was a lesion in the left lower part of the chest wall. The differential diagnosis was between a left renal tumour, a left adrenal tumour or a retroperitoneal sarcoma. In the sagital film (Fig. 5) there is a clear line of cleavage between the tumour and left kidney, so it is not originating from the left kidney. It was thought that if the tumour is originating from the left adrenal gland then the liver lesions will be

Legends for illustrations

Figure 1: CT scan axial view showing the tumour, which is displacing the pancreas anteriorly and upwards. Also note the changes in the left lower chest wall.

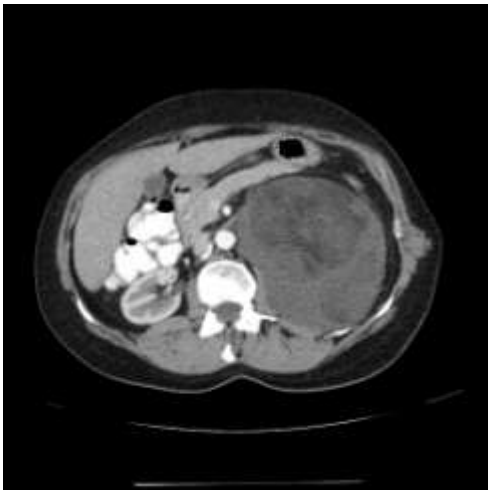


Figure 2: CT scan another axial view showing the tumour, which is displacing the spleen and pancreas.

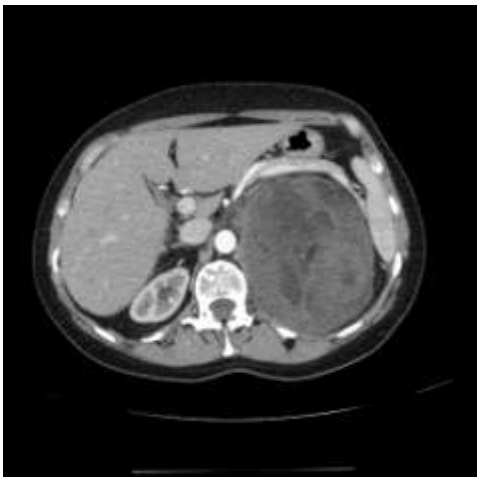


Figure 3: CT scan another axial view showing the hepatic lesions in addition to the tumour.

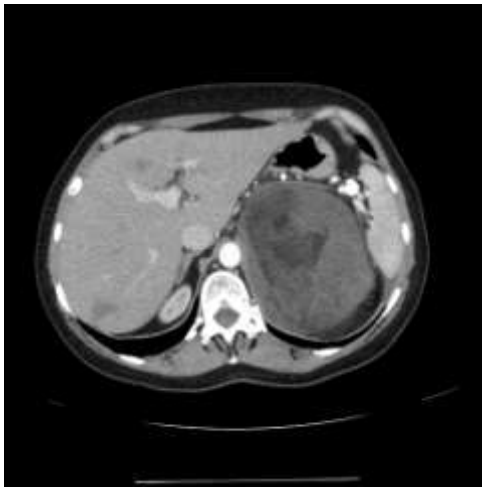


Figure 4: CT scan coronal view showing the tumour and its relation to the surrounding organs /structures.

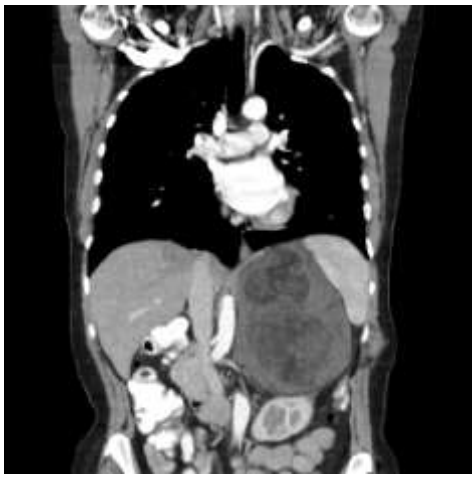
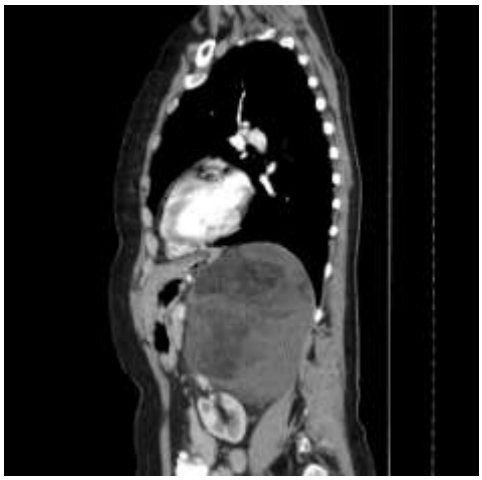


Figure 5: CT scan sagital view showing the tumour and space between it and the left kidney.



considered as metastases and therefore this will be a metastatic adrenal carcinoma, which usually has poor prognosis and unfortunately little if any could be done. On the other hand if this is a RPS then it is usually spread to the lungs and very rarely metastasises to the liver. The nature of the lesion in the left side of the chest wall also needed to be verified. Therefore a tissue diagnosis was felt to be necessary. At this stage an MRI (Magnetic Resonance Imaging) was performed, which added some anatomical description. A percutaneous core biopsy from the main tumour, and one of the liver lesions and from the chest wall lesion were performed. The main tumour was confirmed to be a sarcoma, the findings of the liver lesion were consistent with haemangioma, and the chest wall was a scar tissue. Therefore it was decided to proceed with resection of the main tumour. Through a left subcostal incision the left colon from the left side of the transverse colon to the sigmoid was mobilised. The tumour was able to be dissected away from the left kidney, the spleen, the pancreas, and the abdominal aorta without the need of removing any of these organs/structures. This was followed by uneventful recovery and the patient was discharged well on the fifth postoperative day. The tumour was about 30 cm in longest length and weighed more than 3.0kg. Histologically it was a high grade liposarcoma.

Case two

A 69 year old female patient who is known to be Schizophrenic was admitted

to the psychiatric ward because of acute event of her psychiatric condition. During a routine abdominal examination by the attending medical team, she was discovered to have a palpable, large non-tender mass involving all the left side of the abdomen. Because of the psychiatric situation it was impossible to take a satisfactory clinical history. A CT scan showed a large retroperitoneal mass, which is displacing the left colon, left kidney, left ureter, the spleen, the pancreas, and the distal part of the duodenum. It was also found to have a very close relation to most of the abdominal aorta. The most likely diagnosis was thought to be a large RPS. After thorough and detailed discussion with the patient's two daughters and son, we agreed to proceed with surgery keeping in our mind all possible resections if it will be found to be necessary. The family on separate discussion were able to convince the patient about her condition and acceptance of surgery. Because of the patient's psychiatric condition we took all possible necessary support and measures. The abdomen was explored through a long midline incision. The left colon was mobilised and cautiously the mass was able to be completely freed from all surrounding organs/structures without the need of removing any of them in part or in total. The tumour needed to be freed centimeter by centimeter from the left ureter and abdominal aorta. It was found to receive a main blood supply directly from the abdominal aorta and a main vein draining to the inferior vena cava. The patient had an uneventful recovery and was discharged back to her health institute where she lives. Fortunately she didn't need any special psychiatric management. The longest length of the tumour was about 25.0cm and weighed approximately 2.0kg. Histologically it was a low grade liposarcoma.

Discussion

The often large size of RPS and their close relationship to surrounding organs and structures may limit the ability to achieve a radical, macroscopic clearance (R0 resection)[5]. However, because surgery is the main treatment option then a surgical approach aiming for a complete macroscopic clearance should be attempted whenever it is possible. The concept of "compartment resection" as applied to limb soft tissue sarcomas is difficult to implement in RPS. Proponents of this approach argue that resection of uninvolved organs/structures could improve the incidence of local relapse[6,7]. However, although some structures like the colon, psoas muscle, and possibly the adrenal, and may be part of or all the kidney might be amenable to en bloc resection, the same principle is often unacceptable when applied to other organs/structures, like vascular structures, visceral organs, axial skeleton and vital neural structures[5]. Two recent European studies[6,7] claim 3-fold lower rate in local recurrence through resection of uninvolved adjacent organs/structures. However, criticism has been raised related to the methodology and therefore the results of these studies[5,8]. In the study by Bonvalot et al[6], the authors collected data from an unspecified several institutions across France over 20 year period. Gronchi et al[7] compared patients group in whom extended visceral en bloc resections were performed with historical group that underwent surgery before the introduction of this aggressive surgical approach. Although a lower local recurrence rate was reported in their most recent patients group who have had en bloc resections, these results were challenged by the significantly shorter follow up period for this group of patients, and no benefit in overall survival[5,8]. In addition to that in both studies[6,7] there was no standardisation in

operative technique or the processing and reporting of pathology specimens. Additionally preoperative or post-operative radiotherapy was used in more than a third of the patients in both studies. The author support the principal behind the view and policy of established units[5], which is to obtain macroscopically complete clearance with aggressive en bloc resection of adjacent organs/structures whenever it is possible, but with preservation of uninvolved organs/structures. As shown by the experience of others, the pathology examination seldom demonstrate direct tumour invasion, but rather the tumour 'abut and/or encroach' the adjacent organs[4]. The reporting radiologist often use the same terms because of the close proximity of several retroperitoneal organs/structures to the large sarcomas as seen in our two patients presented above. Strauss et al[5] in a study of 200 cases diagnosed to have primary RPS, 126 (63%) patients required resection of adjacent organs, but in 26 (13%) cases of this group the final histology confirmed direct infiltration of these organs. Their overall disease-specific survival rate at 2 and 5 years was 86.2% and 68.6% respectively[5]. Out of their 200 patients 75 (37.5%) developed local recurrence during follow up. The median local recurrence free survival for the whole 200 patients was 3.8 years however it was 6.8 years for the 170 patients who had a macroscopically complete resection[5]. Others[4] reported an overall median survival for low-grade tumours of 6.1 years compared to 3.6 years for high-grade tumours, and the estimated 5-year survival for low-grade tumours versus high-grade tumours was 100% and 26% respectively[4].

Depending on several factors complete resection rates for primary RPS have been reported to be 65% to 99%[3,9]. Local recurrence is the main failure and occurs in 40% to 80%[2]. It is estimated that 75% of the patients will die as a result of uncontrolled local recurrence associated with multifocal bowel obstruction and cachexia[2,9,10].

Strauss et al[5] found that 73 cases out of their 200 (37.5%) patients studied developed local recurrence. Gholami et al[4] had 15 patients (37%) in their study group developed local recurrence. Grobmyer et al[9] in their thorough study from two tertiary centres (University of Alabama Birmingham and University of Florida) identified 78 cases with locally recurrent RPS. Sixteen patients had both local and distant recurrences while the other 62 cases had only local recurrence. The most common presenting symptoms were abdominal pain, abdominal fullness, and abdominal cramping/nausea/ vomiting. Improving or eliminating these symptoms was achieved by operative intervention for first local recurrence (FLR) in 79% of the patients. The authors further studied those patients who had undergone complete resection of FLR to determine which clinical and/or biologic factors were associated with overall survival. It was found that when 'no tumour resection' was performed and the 'tumour had high grade differentiation' then these two factors were associated with decreased overall survival[9]. Multifocal recurrence was significantly more common in patients who had incomplete resection of the tumour (80%) compared with patients who had complete resection of FLR (22%). The authors also identified and studied 33 patients with second local recurrence and 11 cases presented with third local recurrence. Fewer patients were seen with each subsequent local recurrence of RPS, and the percentage of resected recurrent tumours that were high grade declined with each subsequent local recurrence. The authors also demonstrated that long-term survival is possible in selected patients after resection of second and third recurrences of RPS[9]. Importantly they found that there was no significant difference in overall survival in patients

undergoing resection for second versus third local recurrence, and there was no significant difference in overall survival between selected patients after first, second, or third recurrences. Also in selected patients undergoing operation for third local recurrence, survivals of 51 and 125 months were observed[9]. Gholami et al[4] reported complete resection rates of 100%, 86% and 100% for first, second, and third recurrences respectively. They also indicated that CT scan was able to accurately predict the possibility of complete tumour removal. Grobmyer et al[9] advocate regular CT scan of the chest, abdomen and pelvis after resection every 3 to 6 months for 3 years and then annually for up to 10 years because late recurrences have been observed[11].

The importance of microscopically clear margins (R0 resection) in RPS and how this relates to local recurrence has been investigated[12,13]. Although microscopically clear margins do not reliably predict complete resection, local control could be determined by achieving macroscopic clearance, which is largely observed by the operating surgeon[5]. The optimal evaluation of microscopic margins for RPS is not easy in particularly in large tumours with extensive surface area, and disturbance by handling during the operation, could make assessment of all microscopic margins unreliable. It also depends on the methodology of pathological assessment[12]. Strauss et al[5] found that high grade tumours and inability to obtain macroscopically complete clearance were the only factors found to be statistically significant predictors of local recurrence. In their study[5] they found that there is no difference in local recurrence rates between patients who have negative microscopic margins (R0) and those cases with involved microscopic margins (R1). They also reported that after correcting for grade, macroscopic clearance and size, the pathological subtype of the tumour did not reach statistical significance[5].

The overall disease-specific survival rate at 2 and 5 years after first resection of RPS was found to be 86% and 68% respectively[2,5,14,15].

The high incidence of local recurrence of RPS after resection and its associated death has prompted a multimodality approach, in particularly the use of radiotherapy (RT) and to a less extent chemotherapy (CT) before or after surgery. However, studies which included large number of patients are lacking[5,9,16]. It is also unknown how much benefit from RT could be achieved based on different characteristics of the tumour like size, grade, and lymph node involvement[16]. Although there have been several cohort reports studies or case reports based on single institution experiences[7,17-21] it is not clear as how much these results could be utilised to reach agreed, generalized recommendation[16]. Therefore the association of RT with possible improved overall survival has been difficult to demonstrate[9]. Zhou et al[16] using National Cancer Registry data from the SEER (Surveillance, Epidemiology, and End Results), for 18 or older patients diagnosed to have primary retroperitoneal and non-visceral abdominal sarcoma from 1988-2005, identified a total of 2504 patients, 2230 of them had retroperitoneal sarcoma. Of the 2504 patients, 1901 (75.9%) had locoregional disease, 1547 (81.8%) had surgical resection, and 23.5% of these surgical patients received RT. Their main conclusion was RT may most benefit those patients with operable stage I sarcoma[16]. Others found no significant improvement in survival in those patients who received RT following resection of RPS[4,5] or in patients with recurrent RPS[9]. The other important problem with the use of RT is the toxicity effects of the radiation to the several radiosensitive organ/structures in the region. In order

to reduce such toxicities newer radiation techniques including intensity modulated radiation therapy[24], the use of intraoperative radiotherapy[25], or respiratory guided therapy, image guided radiation therapy, proton or heavy ion radiation therapy, and stereotactic radiation therapy[4] is thought to permit a higher dose of radiation to be given to the tumour or its bed with less normal tissue toxicity. A clinical trial of preoperative radiation for RPS has been completed, and the results are awaiting[26].

The benefits of CT for RPS are even less clear and no trial shows a clear improvement in outcome for these tumours[22,23]. Others used neoadjuvant or adjuvant CT in few of their patients using doxorubicin, ifosfamide, and mesna but again with no clearly demonstrated benefit[4,5].

In Conclusion, Retroperitoneal sarcomas are rare tumours. Their treatment is challenging because of their large size and close proximity to several important organs / structures, which could limit the extent of resection. Surgery in the form of complete macroscopical resection should be the aim because it is the best hope in controlling the disease. High grade tumours and macroscopical resection clearance are the most important factors influencing the incidence of recurrence and long term survival. The use of RT and / or CT is controversial and not clear. CT scan provides detailed information for the diagnosis and plan for surgery, and also for follow up after resection. There are reports of successful second and third resections for local recurrences in selected patients with results comparable to that following the first resection.

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