Glomangiomyoma (Glomus Tumour) of the Kidney: Case Report and Review of the Literature

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Abstract

Background: Glomus tumour is a rare mesenchymal neoplasm affecting the subcutaneous tissue of the distal extremities in the majority of cases. Glomus tumour rarely involves visceral organs. Glomus tumour involving the kidney is extremely rare and would not be encountered by most medical practitioners. In view of the rarity of glomus tumour of the kidney, its biological behaviour may not be known or understood by most medical practitioners.

Aims: To report a case of glomangiomyoma (glomus tumour) of the kidney
To review the literature related to glomus tumour of the kidney and other organs

Case Report: A 32-year-old man presented with a history of vague upper abdominal discomfort and he requested to be investigated to exclude the possibility of a malignancy. He had ultrasound scan of the abdomen including renal tract and pelvis which revealed a lesion in the lower pole of his left kidney. This was thought to be either a complex renal cyst or a renal tumour. He had CT scan and MRI scan of thorax, abdomen and pelvis which revealed an enhancing mass in the lower pole of his left kidney. He underwent left lower pole partial nephrectomy, pursuant to which he has remained well for 20 months without any CT scan and MRI scan evidence of recurrence. Histology of the partial nephrectomy specimen was seen by three pathologists and had features of glomangiomyoma of kidney (a variant of glomus tumour.

Literature review revealed that only thirteen cases of renal glomus tumour have been reported so far. All but one of the glomus tumours, have been benign and they have not recurred. Only one reported case of glomus tumour of the kidney had histological characteristics of a malignant tumour.

Conclusions: Glomus tumour of the kidney is extremely rare.

Including our reported case a total of fourteen glomus tumours of the kidney have been reported in the world literature. Twelve of the tumours, have been benign, one of the tumours was classified as infiltrating glomus tumour of uncertain malignant potential and one malignant glomus tumour of kidney.

Introduction

First accurately described in 1924 by Masson, [1] glomus tumours are mesenchymal neoplasms that look like the modified smooth muscle cells of the normal glomus body. Glomus tumours most often occur in the extremities, typically in the subungual region of the fingers. Glomus tumours represent less than 2% of all soft tissue tumours, and about a quarter of these tumours are found in visceral organs not expressing glomus bodies. Ten percent of glomus tumours are multiple. At times, they have been found to be familial tumours. Glomus tumours have been seen in both sexes with equal frequency, most of them occurring in the 20 to 40 years group. [2] The lesions develop as small blue-red nodules and are generally associated with paroxysmal pain. They are cured by local excision. [3] Glomus tumours arising in the genitourinary regions are extremely rare. A case of renal glomus is reported with a review of the literature.

Case Report

A 32-year-old man presented to his General Practitioner with a history of vague epigastric and upper abdominal discomfort of several weeks duration. He did not have any allergies and was not on any medications. He asked if he could be investigated to exclude the possibility of him having a malignancy. His general and systematic examinations were normal. He had a number of investigations which were
reported as follows:
1. Full blood count was normal
2. Serum Urea and electrolytes were normal
3. Liver function tests were normal
4. Urine microscopy and culture were normal
5. Ultrasound scan revealed a mass in the left kidney which was thought to be either a complex cyst or renal tumour.

He was therefore referred for urology opinion. When he was seen by the Urology team his symptoms remained the same and his general as well as systematic examinations were normal. He had CT and MRI scans of the thorax, abdomen and pelvis which confirmed the presence of an enhancing lesion in the lower pole of the left kidney. The CT and MRI scans showed a 3.2 x 3.7 cm partly exophytic well defined mass in the medial aspect of the lower pole of the left kidney in para-pelvic location. There was no evidence of any lymph node enlargement and no evidence of any metastatic lesion (see illustrations 1; 2; 3; and 4).

He underwent a left lower partial nephrectomy and as part of the operation he had excision of apparently normal renal tissue around the renal lesion for histological examination to exclude margin involvement by the tumour. He had an uneventful post-operative recovery and was discharged home to be follow-up at regular intervals.

The specimen of the renal lesion was examined by 3 different pathologists in order to establish a consensus opinion diagnosis. The two specimens were examined separately.

Macroscopic examination of the surrounding biopsy specimen revealed three pieces of renal tissue. The largest appeared to be wedge-shaped and measured 16 x 7 x 7 mm and the smallest measured 3 mm in maximum diameter. Histological examination of this specimen revealed a piece of kidney which was mainly composed of cortical tissue along with a small amount of medulla. There was no evidence of any malignancy in this specimen, consistent with complete excision of the lesion.

The left partial nephrectomy specimen weighed 40 grams and measured 50 x 35 x 45 mm. The perinephric fat attached to the specimen measured 60 x 40 x 15 mm. Before slicing the specimen a partly cystic mass was seen on the surface which measured 40 x 23 x 40 mm. The resection margin before slicing the specimen revealed a piece of kidney which was mainly composed of cortical tissue along with a small amount of medulla. There was no evidence of any malignancy in this specimen, consistent with complete excision of the lesion.

No abnormal mitotic activity or necrosis was noted. The tumour was confined to the kidney and did not extend into the perinephric fat. The surrounding kidney showed minimal interstitial chronic inflammation. The resection margins were free of tumour. There was no evidence of lymphovascular invasion. On special staining, the tumour associated mucin showed positivity with Alcian blue and it was negative for Hale's colloidal iron.

By immunohistochemistry the tumour showed strong positivity with vimentin and patchy positivity with NCAM (CD56). The tumour was negative for the following immunohistochemical markers: CEA, CD10, CK34E12, AE1/3, HMB45, MART 1 (melan A), Chromogranin, Synaptophysin, CK7, EMA, Racemase, CK19, RCC (renal cell carcinoma marker).

Based upon the morphological features and supported by immunohistochemistry an initial / provisional diagnosis of mucinous tubular and spindle cell carcinoma was suggested. The specimen was sent to the Regional oncology centre for expert opinion. Expert histology review report of the specimen was documented as: a well delineated tumour within the kidney; it compressed adjacent renal parenchyma to form a zone of fibrous tissue at the periphery of the tumour; the lesional cells were set in abundant Alcian blue positive stromal background; they formed anastomosing strands and cords of single regular cells with round nuclei and eosinophilic cytoplasm; solid sheets of similar cells were also seen in places; some cytoplasmic vacuolation was seen but tubules and / or spindle cells were not obvious or conspicuous features; there were scattered vessels, some thick walled several of which showed tumour cells encircling them in a concentric streaming pattern; no necrosis was seen; mitoses were very difficult to find; no lymphovascular invasion was seen (see illustrations 5; 6; and 7).

Further immunohistochemical staining of sections of the tumour were done at the Regional oncology centre, which were reported as follows:
1. The lesional cells were strongly positive for Vimentin, SMA, Calretinin, h-caldesmon and CD34 (see illustrations 8; 9; 10; 11; 12; 13; 14).
2. The lesions showed delicate positivity for collagen
type IV around individual cells.
3. CAIX showed focal / weak positivity in < 10% of cells.
4. There was weak staining for synaptophysin.

Immunohistological staining of the lesion was negative for the following:
5. CK7; AMACR (Racemase); CK19; (positivity for all three markers would be expected in mucinous and tubular and spindle cell carcinoma, which enter the differential diagnosis);
6. S100 protein;
7. p63 (positivity would be expected in myoepithelioma);
8. MNF116; AE1/3; 34 Beta E12; EMA; CEA; (positivity for one or more would be expected in carcinoma);
9. Melan A;
10. HMB45 (positivity is expected in angiomyolipoma / PECOMA);
11. Chromogranin;
12. CD10;
13. Desmin;
14. Uroplakin;
15. MiB-1 stains < 5% of nuclei;
16. FISH was negative for the EWSR1 translocation (such a translocation would be expected in extra-skeletal myxoid chondrosarcoma).

The other differential diagnosis considered, apart from those excluded above, was chondroid variant of urothelial carcinoma, but stated that this should merge with typical urothelial carcinoma (which was absent) and would be positive for cytokeratin. D/PAS showed minimal to absent glycogen and the mucinous material was D/PAS negative. Although the tumour did not bear a superficial resemblance to mucinous tubular and spindle cell carcinoma of kidney, the overall features, including the immunophenotype excluded this possibility.

The reviewing pathologist concluded that the overall features were that of a variant of glomus tumour (glomangiomyoma) of the kidney.

Electron microscopic examination of the tumour was performed by an electron microscopist. The tumour cells showed cytoplasmic filaments with focal densities and continuous well developed external lamina typical of smooth muscle cells. No cytoplasmic crystals were identified (see illustration 15). The ultra-structural findings were compatible with glomangiomyoma.

His post operative recovery was unremarkable. A follow-up CT-scan done 4 months post operatively showed a low attenuation lesion measuring 2 x 1.5 cm at the site of the previous surgery which was thought represented a post-operative inflammatory pseudo-cyst (see illustration 16). A repeat CT scan which was done 14 months post-operatively showed almost complete resolution of this area and therefore it was considered to represent post operative inflammatory scarring (see illustration 17). He has so far been followed up for 20 months without any evidence of recurrence of his renal lesion and without any evidence of any lymph node mass or metastatic lesion based upon the latest MRI scans of thorax, abdomen and pelvis which were done 18 months post operatively (see illustrations 18 and 19).

**Discussion**

Very few cases of renal glomus tumour of the kidney have so far been reported in the literature. Schwarz R [4] in 1957 reported in a German Journal (the article is in German) a glomus tumour which was found in the renal parenchyma. The patient was a 34-year-old pregnant woman who presented with flank pain radiating to the back. No histologic malignant features were seen. Billard and associates [5] in 1991 reported two benign vascular tumours of the kidney capsule. They reported the two cases of benign vascular tumours as: (a) a so called “vascular leiomyoblastoma” which was not a glomus tumour and (b) a glomus tumour (perhaps the first reported glomus tumour of the kidney in the English literature). Billard and associates [5] reported that:

* An ultrastructural study of the first tumour demonstrated smooth muscular characteristics.
* Obvious histological features of glomus were seen in the second.
* Immunohistochemical study revealed positive immunoreactivity for epithelial and mesenchymal antibodies in the two tumours.

Siddiqui and associates [6] in September 2005 reported a case of glomus tumour of the kidney in a 55-year-old woman, which was found incidentally on a computed tomographic scan. Partial nephrectomy revealed a 2-cm encapsulated mass that was architecturally similar to glomus tumour. They also reported that:

* Immunohistochemistry showed positivity of tumour cells for vimentin and smooth muscle actin.
* On electron microscopy, cytoplasmic thin filaments and dense bodies were seen, confirming the smooth muscle nature of the tumour.

They concluded by stating that glomus tumours arising in visceral organs are rare, and those arising in kidney are exceedingly rare.

Al-Ahmadie and associates [7] in April 2007 reported 3 cases of the glomus tumour family in the kidney: (a) a
solid glomus tumour, (b) a glomangioma, (c) a glomangiomyoma. All three tumours involved the renal parenchyma and occurred in 3 men aged 36, 81, and 46 years, respectively. They also reported that:
* All the three tumours were well-circumscribed and showed morphology otherwise identical to those seen in soft tissue.
* All the three tumours were immune-reactive for actin and negative for desmin and S100 and only 1 tumour expressed CD34 in tumour cells.
* Up to the time of their report all three tumours had followed a benign course without evidence of recurrence or metastasis. They concluded by stating that their report expanded the spectrum of mesenchymal tumours of the kidney.

Sasaki and associates [8] in January 2009 reported a case of glomus tumour arising in the kidney of a 62-year-old man who presented with weight loss and an incidental kidney lesion was detected by computed tomographic scan. They stated that their reported case was the sixth case of glomus tumour arising in the kidney. This report should be regarded as the 6th reported case in the English literature and the 7th reported case in the world literature after taking into account the first reported case in the German literature by Schwarz. They reported that:
* Radiologically, the tumour was difficult to differentiate from a malignant lesion and it was therefore excised by partial nephrectomy.
* The tumour was challenging to diagnose by routine haematoxylin and eosin microscopic examination, necessitating immunohistochemical analysis. Immunoreactivity was demonstrated for smooth muscle actin, vimentin, collagen IV, and CD57, with little to no expression of neuroendocrine, endothelial, or epithelial markers.
* Up to the time of their case report, the tumour had followed a benign course without any evidence of local recurrence or metastasis.

Sugimoto and associates [9] in February 2010 reported a 41-year-old man who was diagnosed with a glomus tumour of the kidney, which was incidentally found by ultrasonography. Partial nephrectomy revealed a 10-mm encapsulated mass. They stated that confirmation of their diagnosis of glomus tumour was based upon the use of morphological and immunohistochemical stains.

Nuwayhid and associates [10] in June 2010 reported an adolescent with a benign glomus tumour which was excised by wedge resection. Nuwayhid and associates [10] also stated that:
* Nephron-sparing surgery is the therapy of choice for children with benign renal tumours.

Glomus tumour should be considered in the differential diagnosis of a renal mass in a young patient. Onishi and associates [11] in July 2010 also reported a glomus tumour in a hypoplastic kidney. Gill and Van Vliet [12] in 2010 published the first case of renal glomus tumour of uncertain malignant potential. An additional case of glomus tumour of kidney was reported in October 2011 by Kuroda. [13] Despite the previous observation that glomus tumours of the kidney typically behave like benign lesions, Lamba and associates [14] in February 2011 reported a patient who presented with metastatic, malignant, and highly aggressive glomus tumour arising in the kidney. They stated that in their extensive literature review, they did not come across even a single case of malignant glomus tumor arising in the kidney. They reported the clinical presentation, radiologic, and pathological features of their case. They also discussed the immunohistochemical findings that distinguished their case from other reported cases of glomus tumours arising from the kidney. Lamba and associates [14] reported a 44-year old Hispanic man who presented with a complaint of lower back pain of 7 months duration. He had CT scans which revealed the following:
* A lytic lesion at L1 vertebra suspicious for metastasis;
* Non specific lesion at T11 and L1 vertebrae;
* Retroperitoneal cystic and soft tissue mass;
* The retroperitoneal mass with mixed cystic and solid component was arising from the posterior aspect of the right kidney;
* Multiple osseous metastases involving the spine and pelvic bones.

He also had magnetic resonance imaging of the abdomen and pelvis which revealed the following:
* A persistent filling defect within the right renal vein, suspicious for tumour thrombus;
* The mass was abutting the right hepatic lobe and superior diaphragm.
* Mildly enlarged retroperitoneal nodal masses were noted with the largest measuring 7 mm.

He underwent biopsy of the lesion which had the following pathological characteristics:
* A nested pattern of growth of fairly monotonous tumour cells with occasional mildly dilated thin walled vessels surrounded by tumour cells.
* The cells depicted an epithelioid appearance and they also had eosinophilic cytoplasm, round to oval nuclei with inconspicuous nucleoli.
* Only pleomorphism existed with rare mitotic activity evident.

Immunohistochemistry revealed the following results:
* Focal, strong positivity for CD 34;
* Strong positivity for collagen 4;
* Focal single cell positivity and a vascular pattern with smooth muscle actin;
* Negative for Desmin.

Lamba and associates [14] stated that the aforementioned findings were suggestive of glomus tumour.

Lamba and associates did further immunohistochemistry with a number of other antibodies and they obtained the following results:

* Desmin – occasionally weakly positive cells;
* CD117 – Negative;
* Calretinin – Rare weakly positive cells;
* CD99 – Negative;
* Pancytokeratin, CAMS.2, CK34BE12, 4A4 – Negative;
* Carbonic anhydrase-9 – Negative;
* Inhibin – Negative;
* S100, tyrosinase – Negative;
* Laminin – Negative;
* Chromogranin – Negative;
* Synaptyophysin – Rare weakly positive cells;
* CD31 – Negative;
* CD34 – Positive;
* Collagen IV – Positive;
* Smooth muscle actin – Positive;
* Vimentin – Positive;
* Von Willebrand factor – Negative;
* WTI – Negative.

Using the clinical findings, radiological findings and pathological information, Lamba and associates [14] established a diagnosis of metastatic malignant glomus cell tumour, arising from the kidney with metastases to L1 vertebra and left S1 joint and tumour thrombus. The patient was initially treated by means of palliative radiotherapy to the left hip. He also received one cycle of gemcitabine and docetacel. He developed recurrent anaemia without any evidence of active blood loss for which he had blood transfusions. His hip pain was not improved despite having had radiotherapy. As a result of failure of first-line chemotherapy, he received second line chemotherapy in the form of doxorubicin and dacarbazine. He subsequently developed more generalized weakness and pancytopenia. He died within 6 months of diagnosis.

Based upon the aforementioned reported cases of glomus tumours of kidney, in the absence of any other documented reports, it is concluded that up to date prior to our report 13 cases of glomus tumour of the kidney (1 malignant; 1 of uncertain malignant potential; 11 benign) have so far been reported in the world literature.

It is therefore clear that most of the glomus tumours of the kidney so far reported in the literature have exhibited features of benign lesions with no documented local recurrence or distant metastasis in that 10 of these cases in the English literature and 1 in the German literature (11 in total) have depicted the biological behaviour of benign tumours. Nevertheless, one case of malignant glomus tumour of the kidney has been reported by Lamba and associates [14] and one case of infiltrating glomus tumour of the kidney of uncertain malignant potential has so far been reported by Gill and Van Vliet [12].

To our knowledge our reported case therefore constitutes the 12th case of benign glomus tumour of the kidney and the 14th glomus tumour of the kidney of all types (benign, malignant and uncertain malignant potential) to be reported in the world literature as illustrated in illustration 20.

Apart from the glomus tumours arising from the kidney which have so far been reported, Herawi and associates [15] in 2005 described a unique case of glomus tumour of renal pelvis in a 53-year-old woman who presented with microscopic haematuria associated with obstruction of the uretero-pelvic junction and marked hydronephrosis. At initial gross examination, the tumour mimicked a urothelial carcinoma.

Brathwaite and Poppiti [3] in 1996 reported widespread metastases of a malignant glomus tumour involving the skin, lungs, jejunum, liver, spleen, and lymph nodes.

Watanabe and associates [16] also reported a cutaneous malignant glomus tumour with widespread metastases. The tumour was described as infiltrative, mixed spindle cell/round cell, moderately pleomorphic, and mitotically active. Both cases (reported by Brathwaite and Poppiti) [3]; and Watanabe and associates [16] arose in the setting of benign glomus
tumour. [2] Some other cases of malignant glomus tumours have been reported in the literature [3], and these occurred in the older age group and they have been found in several locations, primarily in the soft tissues and in the gastrointestinal tracts. Folpe and associates [17] retrospectively analyzed 52 cases of atypical glomus tumours of the peripheral soft tissues in an attempt to establish the criteria for malignancy. Folpe and associates [17] proposed the following to be considered as criteria for malignancy:

* Deep location and size larger than 2 cm;
* Or atypical mitotic figures;
* Or moderate – to high-grade nuclear atypia;
* And 5 or more mitoses per 50 high-powered fields.

Folpe and associates [17] stated that all the aforementioned features should be present in the absence of benign glomus component.

In addition, Weiss and Goldblum [2] stated that identification of cytoplasmic actin and the lattice work of collagen 4 at least focally are highly suggestive of a malignant glomus tumour.

Folpe and associates [17] stated that the behaviour of glomus tumours arising in the internal organs, are not well known because of the rarity of such cases and as a result of minimum follow-up of such cases. Malignant glomus tumours have been categorized into 3 groups based upon their histologic appearance as follows:

* Locally infiltrative glomus tumours (LIGT);
* Glomangiosarcoma arising in benign glomus tumours;
* Glomangiosarcomas arising de novo.

Glomus tumours arise from the glomus body which is a specialized smooth muscle-derived structure that regulates blood flow for thermal regulation [18] About 10% of all glomus tumours are multiple, and in some instances they are familial. [19] It has been stated that most patients with glomus tumours are young to middle aged adults. [18] Most glomus tumours occur as painful skin nodules in the upper extremities and these usually affect the subungual region of the fingers, followed by other portions of the distal extremities including the wrist, palm, and foot as common sites. [18] It has been stated that internal locations for example mediastinum, lung, trachea, and stomach are unusual for involvement by glomus tumour. [20], [21] Glomus tumours are usually located in the stratum reticularis of the dermis. And glomus bodies have occasionally been found in unusual sites, for example in the medullary cavity of bone. [2] Nevertheless, approximately 25% of these tumours are found in the visceral organs such as the stomach, lungs, and trachea where glomus bodies have not been reported.

Glomus tumours usually appear as dark lesions on T1-weighted MRI scan and as bright, high-signal intensity lesions on T2-weighted images. Nevertheless, some glomus tumours have low-signal intensity or iso-intensity on T2-weighted images. [17] It has also been stated that MRI scan is useful to detect small lesions but it is not specific for glomus tumour. [9]

The histologic differential diagnosis of glomus tumour of the kidney include: other neoplasms with myoid or pericytic differentiation (hemangiopericytoma, juxtaglomerular cell tumour, leiomyoma, and angiomyolipoma), neuroendocrine tumours (carcinoid tumour and paraganglioma) and metanephric adenoma. Histologic features and a number of immunohistochemical stains differentiate glomus tumour from these entities.

Histologically, glomus tumours are composed of modified perivascular smooth muscle cells arranged in sheets and nests. The cells are round and somewhat cohesive, giving them an epithelioid appearance. [23] Perhaps this led to the initial suggested diagnosis of mucinous tubular and spindle cell carcinoma of kidney in this case.

Lamba and associates [14] stated that:

* glomus tumours histologically are composed of modified perivascular smooth muscle cells arranged in sheets and nests;
* these neoplastic cells are closely arranged with variably sized vessels;
* these cells are round and epithelioid in appearance;
* the vascular cell-glomus cell ratio, their differentiation, and the amount and the composition of the stroma contribute to the histologic appearance of the tumours;
* hemangiopericytomatous vascular arrangement may sometimes be present;
* occasional isolated nests of glomus cells can be identified outside its boundaries and proliferate around the vessels at the periphery of the main tumour;
* despite the epithelioid appearance and close association with vessels, the glomus cells do not express any epithelial or endothelial markers;
* nevertheless the cells show prominent staining with smooth muscle actin;
* desmin is usually negative but some authors have reported positivity (Enzinger and associates [23], as well as Tsuneyoshi and associates [27] also made the same statement.

Gill and van Vliet [12] stated that tumour immune-reactivity for desmin can be variable, ranging from no expression to focal positivity. Gould and associates [24] reported S100 to be positive in their study of infiltrative glomus tumours.
and glomangiosarcomas. Hegyi and associates [25] described p53-positive staining which was more prominent in the malignant component of glomus tumour in comparison with benign areas. Gokten and associates [26] reported weak oestrogen and progesterone positivity in a case of ovarian glomus tumour. It has been stated by Enzinger and associates that:

* The histologic appearance of the tumours depends upon the vascular cell-glomus cell ratio, their differentiation, and the amount and composition of the stroma.
* Three histological variants have been recognized and these include glomus tumour proper, glomangioma, and glomangiomyoma.
* Glomangiomyoma resembles the ordinary glomus tumour but shows gradual transition from glomus cells to elongated mature smooth muscle cells.
* Despite the epithelioid appearance and close association with vessels, the glomus cells do not express any epithelial or endothelial markers. Nevertheless, they show prominent staining with smooth muscle actin and vimentin. No reaction has been noted with S100, synaptophysin, chromogranin, or HMB-45. [23]

Ultrastructural investigations have shown that glomus cells are modified smooth muscle cells. [27]

Siddiqui and associates stated that Myopericytoma and epithelioid leiomyoma should be considered in the differential diagnosis when evaluating a tumour with smooth muscle differentiation. [6]

Myopericytoma comprises a morphologic spectrum of which ranges from tumours that demonstrate multilayered concentric proliferations of spindle cells with myoid features around blood vessels to tumours that resemble glomus tumour but have “pericytoma-like” vessels. [28]

The distinction of epithelioid variant of glomus tumour from epithelioid leiomyoma can be difficult [17], [29]. Cells of epithelioid leiomyoma tend to be larger than those of glomus tumour, with more abundant eosinophilic cytoplasm. They tend to have thick-walled vessels, in comparison with the delicate small vessels that are seen in typical glomus tumour. Additionally, glomus cells are considered to be variants of smooth muscle cells, and unlike conventional smooth muscle cells, their cytoplasm is devoid of glycogen, with only minimal fuchsinophilia which is observed with Masson trichrome [23]. Electron microscopy or staining with periodic acid-Schiff can be helpful in determining the presence or absence of glycogen.

Extra-cutaneous visceral glomus tumours have been described a number of times. [22], [30], [31], [32], [33], [34]. These tumours initially were conjectured to represent hyperplasia or overgrowth of glomus body; [1]; they were subsequently speculated to be neoplastic growths [23]. Other authors are of the opinion that glomus tumour represents a tumour-like mesodermal developmental disorder [27]. There is agreement that these glomus tumours arise from glomus cells. This is interesting in that most extra-cutaneous visceral locations are not known to contain glomus cells. [35] Even though glomus bodies have been occasionally found in unusual sites for example, in the medullary cavity of bone, [34] neither glomus bodies nor ectopic glomus cells have so far been described in the kidney to our knowledge.

Immunohistochemically, glomus tumours exhibit strong diffuse staining for muscle-specific actin and vimentin without a reaction for cytokeratin and vascular endothelial markers such as CD34. Haton and associates reported that cells were positive for CD 34 in about 41.7% of glomus tumours. [36]

**Conclusion**

*Glomus tumour of the kidney is extremely rare* Including our reported case a total of 14 glomus tumours of the kidney have been reported in the world literature of which 12 of the tumours have been benign, one of the tumours was classified as infiltrating glomus tumour of uncertain malignant potential and one malignant glomus tumour of kidney. Our reported case of glomus tumour of the kidney is the 12th benign glomus tumour of the kidney to be reported in the world literature.

Benign glomus tumours are usually encapsulated tumours which stain positively on immunohistochemistry for smooth muscle actin and also for vimentin and about 40% also stain positively for CD34.

“Cytoplasmic thin filaments” and “dense bodies” could be seen confirming the smooth muscle nature of the tumour on electron microscopic examination.

**Acknowledgement**

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Illustrations

Illustration 1

Pre-operative CT Scan showing a mass in lower medial aspect of the left kidney
Illustration 2

Another view of the Pre-operative CT Scan showing the mass in the left lower medial aspect of the left kidney
Illustration 3

Pre-operative MRI Scan showing tumour in lower medial aspect of left kidney
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Another view of Pre-operative MRI Scan showing lesion in lower medial aspect of left kidney
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Haematoxylin and Eosin staining x 2 Magnification Tumour with compressed adjacent renal parenchyma
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Haematoxylin and Eosin staining Magnification x 10 Glomangiomyoma showing concentric arrangement of uniform tumour cells around vascular structures
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Immunohistochemical staining x 10 Magnification. The tumour is showing positive staining with caldesmon
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Immunohistochemical staining x 20. The tumour is showing positive staining with caldesmon
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Immunostaining x 10. The tumour is staining positive with CD 34
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Immunostaining x 20. The tumour is staining positive with CD 34
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Immunohistochemical staining x 10. The tumour cells showing positive staining with SMA
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Immunostaining x 20. The tumour cells showing positive staining with SMA
Illustration 15

Electron microscopic image Magnification x 19000. Tumour cells showing cytoplasmic filaments with focal densities; there is continuous well developed external lamina; this is consistent with glomangiomyoma
Illustration 16

First Post-operative CT Scan showing post operative inflammatory pseudo-cyst around site of previous tumour but no residual neoplasm.
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MRI Scan done 18 months post operatively showing no local recurrence and no post-operative inflammatory pseudo-cyst
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Another view of MRI Scan done 18 months post operatively showing no local recurrence and no post-operative inflammatory pseudo-cyst
Illustration 20

The cases of glomus tumour of kidney (benign; malignant and of uncertain malignant potential) so far reported.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year reported</th>
<th>Type of tumour</th>
<th>Number reported</th>
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<tr>
<td>Schwarz R</td>
<td>1957</td>
<td>Benign glomus tumour of kidney</td>
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<td>2010</td>
<td>Benign glomus tumour of kidney</td>
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