

Table S1. Overview of all included studies.

Author – Year	Study design- Level of evidence	Patients No./ Female	Age years median (range)	Primary Tumors No. patients (percentage)	Interval between Primary & metastases months, median (range)	Laterality No. patients (percentage)	Localization within the Orbit No. patients (percentage)	Tissue infiltrated No. patients (percentage)	Intracranial extension No. patients (percentage)	Symptoms No. patients (percentage)	Imaging features No. patients (percentage)	Extent of surgery No. patients (percentage)	Surgical technique No. patients (percentage)	Chemo therapy No. patients (percentage)	Orbital Radio therapy No. patients (percentage) median (Gy)	Other therapy No. patients (percentage)	Clinical Improve- ment No. patients (percentage)	RANO response No. patients (percentage)	Recurrence orbital metastases No. patients (percentage)	PFS months, median (range)	OS months, median (range)	Alive No. patients (percentage)
Arnett et al. 1965 ¹	Case Report – V	1 / 1	64	Breast	0	R	Superior	Soft Tissue	0	Mass, Pt	N/A	Biopsy	N/A	0	1	Hormonal	No	PD	0	2.0	2.0	1
Chatterjee et al. 1965 ²	Case Report – V	1 / 0	40	CUP	0	L	Superior	Soft Tissue	0	D, Pro, Pt, RE, S	N/A	Complete	Exenteration	0	0	0	Yes	N/A	0	1.0	1.0	0
Mortada et al. 1968 ³	Case Series – IV	10 / 5 (50%)	46.5 (25-55)	3 Breast (30%), 2 Skin (20%), 1 (10%) Liver, Lung, Muscle, Prostate, Thyroid	12.0 (6-24)	7 R (70%), 3 L (30%)	6 Superior (60%) 2 Posterior (20%) 1 Medial (10%) 1 Inferior (10%)	7 Muscle (70%) 2 Soft Tissue (20%) 1 Bone (10%)	0	10 Pro (100%)	N/A	10 Biopsy (100%)	N/A	N/A	10 (100%)	0	0	10 PR (100%)	0	12.0 (6-36)	12.0 (6-36)	0
Honrubia et al. 1971 ⁴	Case Report – V	1 / 1	74	Carcinoid	48.0	B	Inferolateral	Soft Tissue	0	D, Mass	N/A	Biopsy	N/A	0	0	0	0	N/A	0	24.0	24.0	1
Ashton et al. 1974 ⁵	Case Series – IV	2 / 2	53.5 (49-58)	2 Breast (100%)	0.0	2 R (100%)	1 Posterior (10%) 1 Superior (10%)	1 Muscle (10%) 1 Soft Tissue (10%)	0	2 Pt (100%), 1 S (50%)	N/A	1 Biopsy (50%) 1 Partial (50%)	N/A	0	0	0	N/A	N/A	0	54.0 (30-78)	54.0 (30-78)	0
Huh et al. 1974 ⁶	Case Series – IV	70 / 50 (71.4%)	51	28 Breast (40%) 23 Bone (32.8%) 5 Melanoma (7.1%) 3 Lung (4.3%) 3 Prostate (4.3%) 3 Salivary (4.3%) 2 CUP (2.8%) 1 Colon (1.4%) 1 Thyroid (1.4%) 1 Tongue (1.4%)	58.0	9 B (12.8%)	N/A	N/A	N/A	HA, ICH, MI, SpI	12 Osteolytic (17.1%)	70 Biopsy (100%)	N/A	0	70 (100%)	0	50 (71.4%)	N/A	0	6.0 (1-60)	6.0 (1-60)	4 (5.7%)
Saxena et al. 1975 ⁷	Case Report – V	1 / 1	60	Salivary Gland	7.0	R	Posterior	Muscle	0	DV, Pro	N/A	Complete	Exenteration	0	0	0	0	N/A	1	12.0	18.0	1
Usui et al. 1975 ⁸	Case Report – V	1 / 0	79	Prostate	0	L	N/A	N/A	0	D, Pro	N/A	Biopsy	N/A	0	0	Hormonal	1	N/A	0	5.0	5.0	0
Balestrazzi et al. 1976 ⁹	Case Report – V	1 / 0	59	Melanoma	35.0	R	Medial	Soft Tissue	0	Mass	N/A	Complete	N/A	1	0	0	1	CR	0	72.0	72.0	1
Howard et al. 1978 ¹⁰	Case Report – V	1 / 0	47	Kidney	0	R	Superolateral	Bone	0	D, IM, Mass, Pro, S	Osteolytic	Partial	N/A	0	1, 35 Gy	Immunothera py	1	CR	0	9.0	9.0	1
Stewart et al. 1978 ¹¹	Case Report – V	1 / 0	47	Soft Tissue	144.0	L	Lateral	Soft Tissue	0	D, IM, OP	N/A	Partial	N/A	1	0	0	0	PD	0	6.0	6.0	1
Bullock et al. 1980 ¹²	Case Report – V	1 / 1	69	Breast	84.0	R	Inferomedial	Soft Tissue	0	DV, IM	N/A	Biopsy	N/A	0	1	Hormonal	1	PR	0	3.0	3.0	1
Lubin et al. 1980 ¹³	Case Report – V	1 / 0	69	Liver	0	R	Superolateral	Soft Tissue	0	Pro	N/A	Biopsy	N/A	0	1, 30 Gy	0	1	PR	0	1.0	1.0	1
Rush et al. 1980 ¹⁴	Case Report – V	1 / 1	58	Colorectal	1.0	L	Lateral	Soft Tissue	0	IM, Pro	N/A	Biopsy	N/A	0	1, 35 Gy	0	1	PR	0	1.0	1.0	1
Sobol et al. 1980 ¹⁵	Case Report – V	1 / 0	48	Melanoma	72.0	R	Inferolateral	Soft Tissue	0	DV, IM, Pro	N/A	Partial	N/A	0	0	0	1	N/A	0	6.0	6.0	0
Rush et al. 1981 ¹⁶	Case Report – V	1 / 0	28	Testes	27.0	L	Posterior	Soft Tissue	1	DV, OP, Pro	N/A	Biopsy	Decompressi on	0	1, 30 Gy	0	1	PR	0	1.0	1.0	1
Winkler et al. 1981 ¹⁷	Case Report – V	1 / 0	59	Prostate	0	L	Posterior	Soft Tissue	1	IM, Pro, RAPD, VL	Osteolytic	Biopsy	Decompressi on	0	0	0	1	N/A	0	2.0	2.0	1
Wolter et al. 1981 ¹⁸	Case Report – V	1 / 0	77	Prostate	60.0	R	Medial	Bone	0	D, DV, IM, Pro	Osteoblastic	Partial	N/A	0	1	Hormonal	1	N/A	0	21.0	21.0	1
Zubler et al. 1981 ¹⁹	Case Report – V	1 / 0	64	Liver	0	L	Posterior	Soft Tissue	1	Mass, Pro, VL	Osteolytic	Biopsy	N/A	1	1, 40 Gy	0	0	PR	0	3.0	3.0	0

Carriere et al. 1982 ²⁰	Case Report – V	1 / 0	79	Prostate	0	B	Diffuse	Soft Tissue	0	DV, IM, Pro, RAPD	N/A	Biopsy	N/A	0	0	Hormonal	0	N/A	0	1.0	1.0	1
Riddle et al. 1982 ²¹	Case Series – IV	7 / 4 (57.1%)	66 (51-71)	7 Carcinoid (100%)	18.0 (12-60)	N/A	N/A	N/A	N/A	5 Pro (71.4%), 1 D (14.3%), 1 Mass (14.3%)	N/A	3 Biopsy (42.9%) 3 Complete (42.9%) 1 Partial (14.3%)	3 Exenteration (42.9%)	0	0	0	N/A	N/A	0	48.0 (4-108)	48.0 (4-108)	1 (14.3%)
Tertzakian et al. 1982 ²²	Case Series – IV	2 / 0	64 (62-66)	2 Prostate (100%)	15.5 (0-31)	1 L (50%) 1 R (50%)	1 Lateral (50%) 1 Superior (100%)	2 Bone (100%)	N/A	1 D, Pro (50%) 1 No sympt (50%)	N/A	1 FNAB (50%) 1 Biopsy (50%)	N/A	1 (50%)	1 (50%)	1 Hormonal (50%)	0	PD	0	6.0 (3-9)	6.0 (3-9)	1 (50%)
Weitberg et al. 1983 ²³	Case Report – V	1 / 1	55	CUP	0	L	Medial	Bone	0	D, IM, Mass	N/A	Biopsy	N/A	1	1, 40 Gy	0	1	PR	0	12.0	12.0	1
Mortada et al. 1984 ²⁴	Case Series – IV	3 / 3 (100%)	55 (53-56)	3 Breast (100%)	72.0 (60-84)	2 L (66.7%) 1 R (33.3%)	1 Medial (33.3%) 1 Lateral (33.3%) 1 Superior (33.3%)	3 Muscle (100%)	0	3 D (100%) 3 DV (100%)	N/A	3 Biopsy (100%)	N/A	3 (100%)	3, 40 Gy	0	N/A	N/A	0	36.0	36.0	3 (100%)
Reifler et al. 1984 ²⁵	Case Report – V	1 / 0	74	Prostate	13.0	R	Superior	Muscle	0	DV, IM	N/A	FNAB	N/A	0	1, 36 Gy	Hormonal	1	PR	0	1.0	1.0	1
Dunaway et al. 1985 ²⁶	Case Report – V	1 / 0	60	Lung	7.0	L	Superolateral	Bone	0	D, DV, Pt	Osteolytic	Biopsy	N/A	1	1	0	0	PD	0	12.0	12.0	1
Bond et al. 1986 ²⁷	Case Series – IV	2 / 1 (50%)	42 (33-51)	2 Melanoma (100%)	96.0 (84-108)	1 L (50%) 1 R (50%)	1 Inferolateral (50%) 1 Medial (50%)	2 Bone (100%) 1 Muscle (50%)	0	2 S (100%) 1 Mass, Pro (50%) 1 D, OP (50%)	N/A	2 Partial (100%)	2Decompression (100%)	2 (100%)	2 (100%)	0	N/A	1 CR (50%) 1 PD (50%)	0	23.0 (10-36)	23.0 (10-36)	0
Denby et al. 1986 ²⁸	Case Report – V	1 / 0	65	Kidney	0	T	Lateral	Bone	0	D, S	Osteolytic	Partial	N/A	0	0	0	1	CR	0	12.0	12.0	1
Schlaen et al. 1986 ²⁹	Case Report – V	1 / 0	58	Breast	120.0	L	Diffuse	Soft Tissue	0	D, Mass, Pro, RAPD	N/A	Partial	N/A	1	0	0	0	PD	0	1.0	1.0	0
Hornblass et al. 1987 ³⁰	Case Report – V	1 / 1	35	Thyroid	0	R	Superolateral	Bone	0	Mass, S	Osteolytic	Partial	N/A	1	1	0	N/A	N/A	0	1.0	1.0	1
Kaltreider et al. 1987 ³¹	Case Report – V	1 / 1	43	Soft Tissue	83.0	R	Medial	Bone	0	DV, IM, Pro	Osteolytic	Complete	N/A	1	0	0	1	CR	0	7.0	7.0	1
Noci et al. 1987 ³²	Case Report – V	1 / 1	54	Breast	108.0	L	Superolateral	Soft Tissue	0	Pro	N/A	Biopsy	N/A	0	0	0	0	N/A	0	12.0	12.0	0
Oosterhuis et al. 1987 ³³	Case Report – V	1 / 0	35	Melanoma	12.0	R	Lateral	Muscle	0	D, DV, Pro	N/A	Partial	N/A	0	0	0	1	PR	1	9.0	9.0	0
Otto et al. 1987 ³⁴	Case Report – V	1 / 0	41	Skin	108.0	L	Posterior	Soft Tissue	0	Mass, OP	N/A	Complete	Exenteration	1	1, 50 Gy	0	0	PR	0	48.0	48.0	0
Shields et al. 1987 ³⁵	Case Report – V	1 / 1	63	Carcinoid	84.0	R	Superior	Muscle	0	D, OP, Pro	N/A	Complete	N/A	0	0	0	0	N/A	0	1.0	1.0	1
Stefanyszyn et al. 1987 ³⁶	Case Series – IV	4 / 4 (100%)	50 (47-70)	4 Breast (100%)	48 (0-60)	2 L (50%) 2 R (50%)	2 Superior (50%) 1 Inferior (25%) 1 Superolateral (25%)	2 Soft Tissue (50%) 1 Bone (25%) 1 Muscle (25%)	0	3 En (75%) 3 Pro (75%) 1 IM (25%)	N/A	4 Biopsy (100%)	N/A	1 (25%)	4 (100%)	1 Hormonal (25%)	4 (100%)	4 PR (100%)	0	30.0 (3-36)	30.0 (3-36)	4 (100%)
Boldt et al. 1988 ³⁷	Case Series – IV	8 / 0	71.5 (58-84)	8 Prostate (100%)	N/A	7 R (87.5%) 1 L (12.5%)	5 Superior (62.5%) 2 Superolateral (25%) 1 Posterior (12.5%)	6 Bone (75%) 2 Soft Tissue (25%)	0	6 D (85%), 6 Pro (75%), 4 OP (50%), 3 S (37.5%), 2 DV (25%), 2 Pt (25%), 1 Mass (12.5%) 1 RE (12.5%)	4Osteoblastic (50%) 1 Osteolytic (12.5%)	7 Biopsy (87.5%), 1 Complete (12.5%)	N/A	1 (12.5%)	5 (62.5%), 30 Gy	0	7 (87.5%)	2 CR (25%) 5 PR (62.5%) 1 PD (12.5%)	1 (12.5%)	6.5 (3-60)	6.5 (3-60)	2 (25%)
Orcutt et al. 1988 ³⁸	Case Series – IV	6 / 2 (33.3%)	55 (49-87)	6 Melanoma (100%)	36.0 (12-60)	4 L (66.7%) 2 R (33.3%)	2 Medial (33.3%) 1 Diffuse (16.7%) 1 Lateral (16.7%) 1 Posterior (16.7%) 1 Superior (16.7%)	3 Muscle (50%) 2 Soft Tissue (33.3%) 1 Bone (16.7%)	0	5 Pro (83.3%), 3 D (50%), 1 IM (16.7%), 1 OP (16.7%), 1 RE (16.7%),	N/A	3 Complete (50%) 1 Biopsy (33.3%) 1 FNAB	N/A	1 (16.7%)	4 (66.7%), 36 Gy	0	N/A	N/A	0	3.0 (2-6)	3.0 (2-6)	0

										1 S (16.7%), 1 VL (16.7%)		(16.7%)										
Jacobs et al. 1989 ³⁹	Case Series – IV	2 / 0	58.5 (56-61)	2 Breast (100%)	84.0 (72-96)	2 R (100%)	2 Superolateral (100%)	2 Soft Tissue (100%)	0	2 Pro (100%)	N/A	2 Biopsy (100%)	N/A	1 (50%)	1 (50%)	2 Hormonal (100%)	2 (100%)	1 PR (50%) 1 SD (50%)	0	14.0 (12-16)	14.0 (12-16)	2 (100%)
Shields et al. 1988 ⁴⁰	Case Series – IV	35 / 21 (60%)	70	18 Breast (51.4%) 6 Prostate (17.1%) 2 CUP (5.7%) 2 Lung (5.7%) 2 Melanoma (5.7%) 1 Carcinoid (2.9%) 1 Kidney (2.9%)	N/A	21 R (60%) 12 L (34.3%) 2 B (5.7%)	N/A	N/A	0	18 D (51.4%) 17 Pro (48.6%) 7 Mass (20%) 7 OP (20%) 6 RE (17.1%) 6 VL (17.1%) 5 RAPD (14.3%) 2 S (5.7%)	N/A	35 Biopsy (100%)	N/A	N/A	N/A	N/A	N/A	N/A	0	13.0	13.0	N/A
Malviya et al. 1989 ⁴¹	Case Report – V	1 / 1	66	Ovary	0	L	Posterior	Fat	0	VL	0	Complete	N/A	1	0	0	0	PR	0	3.0	3.0	1
Ruusuvaara et al. 1989 ⁴²	Case Report – V	1 / 0	63	Melanoma	53.0	R	Posterior	Soft Tissue	0	IM, Pro	N/A	FNAB	N/A	1	0	0	0	PD	0	1.0	1.0	0
Spaide et al. 1989 ⁴³	Case Report – V	1 / 0	61	Lung	0	R	Superolateral	Soft Tissue	0	Mass, Pro, RAPD, S	N/A	Biopsy	N/A	1	0	0	1	CR	0	3.0	3.0	1
Capone et al. 1990 ⁴⁴	Case Series – IV	5 / 2 (40%)	63 (37-71)	1 Breast, Gastric, Kidney, Melanoma, Skin (20%)	24 (6-48)	2 B (40%) 2 R (40%) 1 L (20%)	3 Diffuse (60%) 2 Lateral (40%)	5 Muscles (100%)	0	4 DI (80%), 3 IM (60%), 3 Pro (60%), 2 OP (40%), 2 RE (40%), 1 DV (20%)	N/A	4 FNAB (80%) 1 Biopsy (20%)	N/A	5 (100%)	4 (80%), 30 Gy	0	1 (20%)	1 PR (20%)	0	4.0 (3-23)	4.0 (3-23)	1 (20%)
Friedman et al. 1990 ⁴⁵	Case Report – V	1 / 0	72	Thyroid	6.0	R	Medial	Muscle	0	OP, RE, RAPD	N/A	Partial	N/A	0	0	0	1	N/A	0	12.0	12.0	0
Goldberg et al. 1990 ⁴⁶	Case Series – IV	36 / 24 (66.7%)	64 (35-86)	13 Breast (36.1%), 5Melanoma (13.9%) 4 Prostate (11.1%), 3 CUP (8.3%), 3Smallbowel (8.3%) 2 Lung (5.6%) 1 Carcinoid (2.8%), 1 Ovary (2.8%), 1 Pancreas (2.8%), 1 Skin (2.8%), 1 Soft Tissue (2.8%) 1 Uterus (2.8%)	29.5 (0-240)	17 L (47.2%) 16 R (44.4%) 3 B (8.3%)	6 Medial (16.7%) 4 Lateral (11.1%) 4 Superior (11.1%) 3 Diffuse (8.3%) 3 Inferior (8.3%)	11 Soft Tissue (30.6%) 10 Bone (27.8%) 4 Muscle (11.1%)	0	21 IM (58.3%) 17 D (47.2%) 13 Pro (36.1%) 13 Pt (36.1%) 12 Mass (33.3%) 10 OP (27.8%) 9 En (25%) 8 DV (22.2%) 8 S (22.2%) 1 RAPD (2.8%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4.0 (1-76)	40. (1-76)	0
Shetlar et al. 1990 ⁴⁷	Case Series – IV	3 / 2 (66.7%)	51 (38-71)	3 Carcinoid (100%)	46.0 (9-69)	2 L (66.7%) 1 R (33.3%)	2 Posterior (66.7%) 1 Medial (33.3%)	2 Soft Tissue (66.7%) 1 Muscle (33.3%)	0	3 Pro (100%) 1 RAPD (33.3%)	N/A	N/A	N/A	0	0	0	0	N/A	0	12.0 (5-24)	12.0 (5-24)	2 (66.7%)
Wakisaka et al. 1990 ⁴⁸	Case Report – V	1 / 0	58	Liver	0	L	Superolateral	Soft Tissue	1	D, Pro, Pt	Osteolytic	Complete	N/A	0	0	0	1	N/A	0	10.0	10.0	0
Felip et al. 1991 ⁴⁹	Case Report – V	1 / 1	64	Breast	0	R	Medial	Muscle	0	D, Pro, VL	N/A	Biopsy	N/A	0	0	0	0	N/A	0	3.0	3.0	1
Glazer et al. 1991 ⁵⁰	Case Report – V	1 / 1	64	Breast	0	R	Medial	Muscle	0	RE, S	N/A	Biopsy	N/A	1	1, 35 Gy	0	1	N/A	0	12.0	12.0	1
Van der Heijden et al. 1991 ⁵¹	Case Report – V	1 / 1	47	Breast	60.0	R	Inferior	Muscle	0	D, IM, Mass	N/A	Biopsy	N/A	0	1	0	1	PR	0	12.0	12.0	1
Zucker et al. 1991 ⁵²	Case Report – V	1 / 1	83	Skin	60.0	R	Inferior	Soft Tissue	0	D, IM, Pro	N/A	Biopsy	N/A	0	1	0	1	PR	0	3.0	3.0	1
Brackup et al. 1992 ⁵³	Case Report – V	1 / 0	54	Melanoma	48.0	R	Lateral	Muscle	0	IM, OP, Pro	N/A	Partial	Decompressi on	0	1, 50 Gy	0	0	PR	0	9.0	9.0	0
Di Leo et al. 1992 ⁵⁴	Case Report – V	1 / 1	77	Prostate	0	L	Medial	Muscle	0	D, OP, Pro	N/A	Biopsy	N/A	0	0	Hormonal	1	PR	0	14.0	14.0	1

Shetty et al. 1992 ⁵⁵	Case Report – V	1 / 1	74	Colorectal	24.0	L	Superior	Bone	0	Mass, Pro	N/A	Biopsy	N/A	0	1	0	0	PD	0	2.0	2.0	0
Tijl et al. 1992 ⁵⁶	Case Series – IV	34 / 27 (79.4%)	65 (32-88)	20 Breast (58.8%) 5 Prostate (14.7%) 3 Melanoma (8.8%) 2 Kidney (5.9%) 2 Soft Tissue (5.9%) 1 Lung (2.9%) 1 Thyroid (2.9%)	21.0 (0-240)	18 R (52.9%) 12 L (35.3%) 4 B (11.8%)	N/A	N/A	N/A	15 Pro (44.1%) 13 D (38.2%) 7 Pt (20.6%) 6 En (17.6%) 5 IM (14.7%) 5 Mass (14.7%) 3 DV (8.8%) 2 OP (5.9%)	N/A	34 Surgery (100%) 7 Partial (20.6%)	N/A	7 (20.6%)	20 (58.8%)	13 Hormonal (38.2%)	N/A	24 PR (70.6%) 4 PD (11.8%)	0	26.0 (4-75)	26.0 (4-75)	16 (47%)
Vanderpum et al. 1992 ⁵⁷	Case Report – V	1 / 0	61	Thyroid	0	R	Medial	Muscle	0	D, DV, OP, Pro	N/A	Partial	N/A	0	0	0	1	PR	0	12.0	12.0	0
Bersani et al. 1994 ⁵⁸	Case Report – V	1 / 0	50	Kidney	180.0	L	Superolateral	Soft Tissue	0	DV, OP, Pro, RAPD	N/A	Complete	N/A	0	1	0	1	PR	0	12.0	12.0	1
Ellis et al. 1994 ⁵⁹	Case Report – V	1 / 0	86	Melanoma	0	L	Superior	Soft Tissue	0	IM, Mass, Pro, Pt	N/A	Biopsy	N/A	0	1, 31 Gy	0	0	SD	0	18.0	18.0	0
Hugkultstone et al. 1994 ⁶⁰	Case Report – V	1 / 0	45	Bladder	0	B	Medial	Soft Tissue	0	D, IM, Mass	N/A	Biopsy	N/A	1	1	0	0	PD	0	5.0	5.0	0
Loo et al. 1994 ⁶¹	Case Report – V	1 / 1	71	Liver	0	R	Superior	Muscle	1	DV, IM	Osteolytic	Complete	N/A	0	0	0	0	PD	0	3.0	3.0	0
Tranfa et al. 1994 ⁶²	Case Report – V	1 / 0	85	Liver	0	R	Superolateral	Soft Tissue	0	DV, OP, Pro	Osteolytic	Partial	N/A	0	0	0	1	N/A	0	3.0	3.0	1
Aburn et al. 1995 ⁶³	Case Report – V	1 / 0	64	Carcinoid	11.0	L	Superior	Bone	0	D, DV, Pro	N/A	Partial	N/A	0	1, 30 Gy	0	1	PR	0	12.0	12.0	0
Airolidi et al. 1995 ⁶⁴	Case Report – V	1 / 0	77	Kidney	77.0	R	Medial	Bone	0	Pro	Osteolytic	Complete	Exenteration	0	1	0	1	N/A	0	14.0	14.0	0
Day et al. 1995 ⁶⁵	Case Report – V	1 / 0	55	Salivary Gland	0	L	Posterior	Soft Tissue	0	D, S	N/A	Complete	Exenteration	0	1, 60 Gy	0	1	CR	0	72.0	72.0	1
Fan et al. 1995 ⁶⁶	Case Series – IV	3 / 2 (66.7%)	58 (51-85)	3 Carcinoid (100%)	0	2 L (66.7%) 1 R (33.3%)	N/A	N/A	N/A	2 IM (66.7%) 2 Pro (66.7%) 1 D (33.3%) 1 DV (33.3%)	N/A	3 Biopsy (100%)	N/A	2 (66.7%)	2 (66.7%)	0	1 (33.3%)	2 PR (66.7%)	0	12.0 (0.5-24)	12.0 (0.5-24)	0
Rhatigan et al. 1995 ⁶⁷	Case Report – V	1 / 1	64	Breast	60.0	B	Superolateral	Soft Tissue	0	IM, OP, Pro	N/A	Biopsy	N/A	0	1	0	0	PD	0	0.5	0.5	0
Thomas et al. 1995 ⁶⁸	Case Report – V	1 / 1	58	Salivary Gland	192.0	R	Lateral	Muscle	0	Pro, S	N/A	Partial	Decompressi on	1	0	0	1	CR	0	12.0	12.0	1
Burnstine et al. 1996 ⁶⁹	Case Report – V	1 / 1	46	Breast	24.0	R	Inferior	Muscle	0	D, OP, Pro	N/A	Partial	N/A	0	1, 60 Gy	0	0	N/A	1	4.0	11.0	0
El-Toukhy et al. 1996 ⁷⁰	Case Report – V	1 / 0	45	Carcinoid	0	R	Superior	Soft Tissue	1	Pro, Pt, RAPD	N/A	Partial	Decompressi on	0	0	0	1	N/A	1	36.0	144.0	1
Char et al. 1997 ⁷¹	Case Series – IV	31 / 16 (51.6%)	57 (37-77)	9 Breast (29%) 8 Melanoma (25.8%) 6 CUP (19.3%) 2 Prostate (6.4%) 1 Carcinoid, Lung, Kidney, Salivary, SoftTissue, Stomach (3.2%)	N/A	N/A	N/A	N/A	N/A	15 D (48.4%) 8 Pro (25.8%) 5 DV (16.1%) 1 RE (3.2%)	N/A	16 Partial (51.6%) 15 FNAB (43.4%)	N/A	N/A	N/A	N/A	N/A	N/A	0	15.0	15.0	N/A
Fezza et al. 1997 ⁷²	Case Report – V	1 / 1	75	Soft Tissue	180.0	L	Medial	Muscle	0	DV, IM, Pro	N/A	Biopsy	N/A	0	1, 46 Gy	0	1	N/A	0	2.0	2.0	1
Hayashi et al. 1997 ⁷³	Case Report – V	1 / 1	63	Bone	324.0	R	Posterior	Bone	1	DV	Osteolytic	Complete	N/A	0	1, 50 Gy	0	0	N/A	0	6.0	6.0	1
Logrono et al. 1997 ⁷⁴	Case Report – V	1 / 0	45	Soft Tissue	21.0	L	Superior	Fat	0	Pro, S	0	FNAB	N/A	0	1, 50 Gy	0	1	N/A	0	8.0	8.0	0
Mezer et al. 1997 ⁷⁵	Case Report – V	1 / 1	70	Kidney	84.0	R	Inferolateral	Soft Tissue	0	D, DV, Mass	N/A	Partial	N/A	0	1, 50 Gy	0	1	N/A	1	2.0	4.0	1

Sekundo et al. 1997 ⁷⁶	Case Report – V	1 / 1	54	Breast	0	L	Superomedial	Fat	0	IM, Mass, Pro	N/A	Biopsy	N/A	1	0	0	1	N/A	0	24.0	24.0	1
Zambarakji et al. 1997 ⁷⁷	Case Report – V	1 / 1	49	Breast	6.0	R	Diffuse	Muscle	0	D, IM	N/A	Biopsy	N/A	0	1	0	1	N/A	0	3.0	3.0	1
Font et al. 1998 ⁷⁸	Case Report – V	1 / 1	79	Liver	0	R	Lateral	Bone	0	IM, OP, Pro, RAPD, S	Osteolytic	Biopsy	N/A	0	1	0	1	PR	0	36.0	36.0	1
Garcia et al. 1998 ⁷⁹	Case Report – V	1 / 0	43	Breast	0	B	Diffuse	Soft Tissue	0	IM, Pro	N/A	Biopsy	N/A	0	1, 45 Gy	0	1	PR	0	3.0	3.0	1
Schaefer-Hirschkind et al. 1998 ⁸⁰	Case Report – V	1 / 0	81	Kidney	36.0	L	Posterior	Soft Tissue	0	OP, Pro	N/A	Biopsy	N/A	1	1	0	0	PD	0	3.0	3.0	1
Toller et al. 1998 ⁸¹	Case Report – V	1 / 1	47	Breast	96.0	B	Diffuse	Soft Tissue	0	D, DV, OP, RAPD	N/A	Biopsy	N/A	0	0	0	0	PD	0	9.0	9.0	0
Collins et al. 1999 ⁸²	Case Report – V	1 / 0	47	Esophagus	12.0	L	Superomedial	Soft Tissue	0	Mass	N/A	Biopsy	N/A	N/A	N/A	N/A	N/A	N/A	0	3.0	3.0	1
Scolyer et al. 1999 ⁸³	Case Report – V	1 / 0	77	Liver	2.0	R	Superolateral	Bone	0	S	N/A	Complete	N/A	N/A	N/A	N/A	N/A	N/A	0	3.0	3.0	1
Wein et al. 1999 ⁸⁴	Case Report – V	1 / 1	62	Carcinoid	0	L	Posterior	Soft Tissue	0	DV, RAPD	N/A	Biopsy	N/A	1	1	0	0	PD	0	3.0	3.0	1
Wolstencroft et al. 1999 ⁸⁵	Case Report – V	1 / 1	53	Breast	0	L	Diffuse	Soft Tissue	0	DV, En	N/A	Biopsy	N/A	1	1	Hormonal	N/A	SD	0	4.0	4.0	1
Callejo et al. 2000 ⁸⁶	Case Report – V	1 / 0	72	Soft Tissue	0	L	Lateral	Fat	0	D, IM, Mass, Pro, RAPD	N/A	Partial	N/A	0	1, 30 Gy	0	1	PR	0	9.0	9.0	0
Daumerie et al. 2000 ⁸⁷	Case Report – V	1 / 1	59	Thyroid	0	L	Superolateral	Bone	1	DV, Pro, S	Osteolytic	Biopsy	N/A	0	0	Radioiodine	1	PR	0	36.0	36.0	0
Friedrich et al. 2000 ⁸⁸	Case Report – V	1 / 1	61	Salivary Gland	180.0	R	Lateral	Bone	0	IM, Pro	Osteolytic	Partial	N/A	0	1	0	1	PR	0	36.0	36.0	0
Stuntz et al. 2000 ⁸⁹	Case Report – V	1 / 0	40	Breast	0	B	Diffuse	Soft Tissue	0	DV, Mass, OP	N/A	Biopsy	N/A	1	1	0	0	PD	0	34.0	34.0	0
Bartley et al. 2001 ⁹⁰	Case Report – V	1 / 0	24	Adrenal Gland	24.0	R	Superolateral	Bone	1	D, OP, Pt	Osteolytic	Partial	Decompression	0	1, 37.5 Gy	0	N/A	N/A	1	8.0	15.0	0
Shields et al. 2001 ⁹¹	Case Series – IV	70 / 45 (64.3%)	N/A	40 Breast (57.1%) 10 Prostate (14.3%) 7 Lung (10%) 4 Kidney (5.7%) 4 Melanoma (5.7%) 3 Carcinoid (4.3%) 2Smallbowel (2.8%)	55.0 (6-90)	34 R (48.6%) 33 L (47.1%) 3 B (4.3%)	41 Diffuse (58.6%)	41 Soft Tissue (58.6%), 23 Bone (32.9%)	N/A	38 IM (54.3%) 35 Pro (50%) 31 Mass (44.3%) 16 DV (22.9%) 12 OP (17.1%) 8 En (11.4%) 6 D (8.6%)	23 Osteolytic (32.9%)	52 Biopsy (74.3%) 18 Complete (25.7%)	N/A	50 (71.4%)	39 (55.7%), 35 Gy	0	N/A	N/A	0	20.0	20.0	N/A
Maheshwari et al. 2002 ⁹²	Case Report – V	1 / 0	56	Tongue	0	L	Diffuse	Fat	0	DV, OP, IM, Pro, S	N/A	Biopsy	N/A	1	1, 45 Gy	0	1	CR	0	13.0	13.0	1
McCulley et al. 2002 ⁹³	Case Report – V	1 / 1	29	Cervix	1.0	R	Inferior	Soft Tissue	0	IM, Pro	N/A	Biopsy	N/A	1	1	0	0	PD	0	8.0	8.0	0
Misra et al. 2002 ⁹⁴	Case Report – V	1 / 1	40	Gallbladder	2.0	L	Superomedial	Muscle	0	D, IM	N/A	FNAB	N/A	0	0	0	0	PD	0	2.0	2.0	1
Baltogiannis et al. 2003 ⁹⁵	Case Report – V	1 / 0	79	Prostate	1.0	L	Medial	Bone	0	DV, IM, Pro	N/A	Complete	Exenteration	N/A	N/A	N/A	N/A	N/A	0	10.0	10.0	0
Baroody et al. 2003 ⁹⁶	Case Series – IV	2 / 1	37 (37-38)	2 Melanoma (100%)	19.5 (3-36)	R	1 Posterior (50%) 1 Superomedial (50%)	2 Soft Tissue (100%)	0	IM	N/A	1 Biopsy (50%) 1 Complete (50%)	1Exenteration (50%)	0	0	2Immunotherapy (100%)	1	N/A	0	36.0 (26-46)	36.0 (26-46)	1 (50%)
Fynn-Thompson et al. 2003 ⁹⁷	Case Report – V	1 / 0	68	Bladder	48.0	L	Diffuse	Soft Tissue	0	D, DV, Pro	N/A	Biopsy	N/A	0	0	0	0	PD	0	1.0	1.0	0
Holland et al. 2003 ⁹⁸	Case Series – IV	20 / 11 (55%)	67 (29-90)	8 Breast (40%) 3Smallbowel (15%) 2 CUP (10%) 2 Lung (10%) 2 Melanoma (10%) 2 Prostate (10%)	N/A	10 L (50%) 7 R (35%) 3 B (15%)	N/A	9 Soft Tissue (45%) 7 Muscle (35%) 4 Bone (20%)	0	11 S (55%) 10 D (50%) 9 RE (45%) 7 Pro (35%) 4 OP (20%) 3 DV (15%)	N/A	11 Partial (55%) 9 Biopsy (45%)	2Decompression (10%)	4 (20%)	7 (35%)	1 Hormonal (5%)	N/A	N/A	0	14.7 (0.5-107)	14.7 (0.5-107)	1 (5%)

1 Bladder (5%)										1 En (5%)												
Lekse et al. 2003 ⁹⁹	Case Report – V	1 / 1	78	Small bowel	4.0	R	Inferior	Muscle	0	D	N/A	Biopsy	N/A	0	0	0	0	PD	0	3.0	3.0	0
Saleh et al. 2003 ¹⁰⁰	Case Report – V	1 / 1	54	Salivary Gland	5.0	L	Medial	Fat	0	D	N/A	Partial	N/A	0	1	0	0	PR	0	6.0	6.0	1
Takemoto et al. 2003 ¹⁰¹	Case Report – V	1 / 0	39	Carcinoid	120.0	R	Superior	Bone	1	D	N/A	Biopsy	N/A	N/A	N/A	N/A	N/A	N/A	0	2.0	2.0	1
Tehrani et al. 2003 ¹⁰²	Case Report – V	1 / 0	72	Soft Tissue	24.0	L	Medial	Soft Tissue	0	D, Mass, Pro	0	Biopsy	N/A	1	1, 30 Gy	0	0	PD	0	7.0	7.0	0
Zografos et al. 2003 ¹⁰³	Case Series – IV	7 / 4 (57.1%)	54 (34-77)	7 Melanoma (100%)	65.0 (7-106)	N/A	N/A	N/A	N/A	5 IM (71.4%) 5 Pro (71.4%) 4 Mass (57.1%) 4 RE (57.1%) 2 DV (28.6%) 2 Pt (28.6%) 1 OP (14.3%) 1 S (14.3%)	N/A	3 Partial (42.8%) 1 Complete (14.3%)	1Exenteratio n (14.3%)	3 (42.8%)	1 (14.3%), 40 Gy	0	N/A	2 CR (28.6%), 2 PR (28.6%), 2 PD (28.6%), 1 SD (14.3%)	0	5.0 (1-48)	5.0 (1-48)	2 (28.6%)
Chua et al. 2004 ¹⁰⁴	Case Report – V	1 / 1	78	Bladder	48.0	R	Superolateral	Soft Tissue	1	IM, Mass, Pro, Pt	N/A	Biopsy	N/A	1	1	0	0	PD	0	1.0	1.0	0
Glazer-Hockstein et al. 2004 ¹⁰⁵	Case Report – V	1 / 0	61	Soft Tissue	48.0	R	Lateral	Bone	1	Pro, S	N/A	Complete	N/A	N/A	N/A	N/A	N/A	N/A	0	2.0	2.0	1
Lell et al. 2004 ¹⁰⁶	Case Report – V	1 / 1	63	Breast	0	B	Diffuse	Soft Tissue	0	Pro, S	N/A	Biopsy	N/A	N/A	N/A	N/A	N/A	N/A	0	3.0	3.0	1
Van der Zee et al. 2004 ¹⁰⁷	Case Report – V	1 / 1	77	Breast	12.0	L	Superomedial	Bone	0	D	N/A	Complete	N/A	0	1, 30 Gy	Hormonal, LITT	1	PD	1	10.0	35.0	1
Zdinak et al. 2004 ¹⁰⁸	Case Report – V	1 / 0	39	Kidney	0	L	Medial	Muscle	0	IM, OP, Pro	N/A	Partial	Decompressi on	0	0	Immunothera py	0	N/A	0	3.0	3.0	0
Borota et al. 2005 ¹⁰⁹	Case Report – V	1 / 0	61	Carcinoid	15.0	L	Inferior	Muscle	0	DV, IM, Pro	N/A	Complete	N/A	1	0	Immunothera py	1	CR	0	3.0	3.0	1
Challagundla et al. 2005 ¹¹⁰	Case Report – V	1 / 0	53	Prostate	N/A	R	Diffuse	Muscle	1	D, Pro, RAPD	N/A	Biopsy	N/A	1	1, 40 Gy	0	1	PR	0	6.0	6.0	0
Fabi et al. 2005 ¹¹¹	Case Report – V	1 / 0	53	Soft Tissue	24.0	B	Diffuse	Muscle	0	D, Pro	N/A	Biopsy	N/A	1	1, 30 Gy	0	1	PD	0	7.0	7.0	1
Gupta et al. 2005 ¹¹²	Case Report – V	1 / 0	45	Liver	0	L	Superolateral	Bone	1	IM, Mass, Pro	N/A	Biopsy	N/A	0	0	0	0	PD	0	1.0	1.0	1
Hart et al. 2005 ¹¹³	Case Report – V	1 / 0	70	Kidney	18.0	L	Lateral	Muscle	0	D, IM, Pro, S	N/A	Biopsy	N/A	N/A	N/A	N/A	N/A	N/A	0	1.0	1.0	1
Konuk et al. 2005 ¹¹⁴	Case Report – V	1 / 0	44	Soft Tissue	36.0	L	Superolateral	Soft Tissue	1	DV, Pro, RAPD	N/A	Partial	Decompressi on	0	1, 30 Gy	0	0	PR	0	6.0	6.0	1
Mohadjer et al. 2005 ¹¹⁵	Case Report – V	1 / 1	50	Breast	0	R	Superolateral	Fat	N/A	OP, Pro	N/A	Biopsy	N/A	1	1, 30 Gy	0	1	PR	0	120.0	120.0	1
Puglisi et al. 2005 ¹¹⁶	Case Report – V	1 / 0	53	Gallbladder	1.0	R	Lateral	Muscle	0	Pro	N/A	FNAB	N/A	1	1	0	0	PD	0	6.0	6.0	1
Aralikatti et al. 2006 ¹¹⁷	Case Report – V	1 / 0	63	Esophagus	5.0	L	Superolateral	Soft Tissue	1	Mass, S	N/A	Biopsy	N/A	0	1	0	0	PD	0	2.0	2.0	0
Lee et al. 2006 ¹¹⁸	Case Report – V	1 / 0	56	Stomach	0	R	Posterior	Soft Tissue	0	D	N/A	Complete	N/A	1	0	0	1	SD	0	12.0	12.0	1
Mehta et al. 2006 ¹¹⁹	Case Series – IV	13 / 4 (30.8%)	68 (40-75)	13 Carcinoid (100%)	N/A	N/A	N/A	7 Muscle (53.8%) 6 Fat (46.1%)	N/A	9 Pro (69.2%) 4 DV (30.8%) 4 IM (30.8%) 2 D (15.4%) 1 Mass (7.7%) 1 No sympt (7.7%)	N/A	13 Surgery (100%) 4 Complete (30.8%)	4Exenteratio n (30.8%)	1 (7.7%)	9 (69.2%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oida et al. 2006 ¹²⁰	Case Report – V	1 / 0	72	Liver	120.0	L	Superolateral	Soft Tissue	1	D, DV	Osteolytic	Partial	Decompressi on	0	0	0	1	PR	0	4.0	4.0	0
Schick et al. 2006 ¹²¹	Case Series – IV	10 / 4 (40%)	N/A	5 Lung (50%) 3 Breast (30%)	3.0 (0-132)	N/A	7 Posterior (70%) 3 Diffuse (20%)	6 Soft Tissue (60%)	0	N/A	N/A	3 Complete (30%)	N/A	4 (40%)	4 (40%)	1 Hormonal	N/A	N/A	3 (30%)	11.0 (1-36)	11.5 (1-36)	1 (10%)

				1 CUP (10%)			4 Bone (40%)				3 Partial (30%)												
				1 Uterus (10%)																			
Sharma et al. 2006 ¹²²	Case Report – V	1 / 0	69	Kidney	0	L	Superolateral	Soft Tissue	1	Mass, Pro, Pt	Osteolytic	Biopsy	N/A	0	1	0	1	PR	0	4.0	4.0	1	
Singh et al. 2006 ¹²³	Case Report – V	1 / 1	45	Ovary	36.0	L	Posterior	Fat	0	OP, S	N/A	Partial	N/A	0	0	0	0	PD	0	2.0	2.0	0	
Solari et al. 2006 ¹²⁴	Case Series – IV	1 / 1	81	Breast	24.0	L	Superolateral	Soft Tissue	0	Mass, Pro, RE	N/A	Biopsy	N/A	0	1	0	1	PR	0	3.0	3.0	1	
Tumuluri et al. 2006 ¹²⁵	Case Report – V	1 / 1	75	Esophagus	6.0	L	Medial	Soft Tissue	0	D, OP, Pt	N/A	Biopsy	N/A	0	1	0	1	PR	0	12.0	12.0	1	
Yunker et al. 2006 ¹²⁶	Case Report – V	1 / 1	69	Stomach	0	L	Superomedial	Soft Tissue	0	D, IM, Mass, Pt	N/A	Biopsy	N/A	N/A	N/A	N/A	N/A	N/A	0	2.0	2.0	1	
Char et al. 2007 ¹²⁷	Case Report – V	1 / 1	87	Uterus	8.0	R	Superior	Fat	0	OP, Pt, S	N/A	Complete	N/A	N/A	N/A	N/A	N/A	N/A	0	2.0	2.0	1	
Gerencer et al. 2007 ¹²⁸	Case Report – V	1 / 1	58	Carcinoid	12.0	R	Medial	Muscle	0	D, IM, VL	N/A	Biopsy	N/A	0	1, 44 Gy	0	1	PR	0	24.0	24.0	1	
Isshiki et al. 2007 ¹²⁹	Case Report – V	1 / 0	70	Prostate	0	L	Superolateral	Bone	1	DV, IM, Pro	Osteolytic	Complete	N/A	0	0	0	1	CR	0	12.0	12.0	1	
Lin et al. 2007 ¹³⁰	Case Report – V	1 / 0	60	Bladder	8.0	R	Superomedial	Soft Tissue	0	D, DV, Pro	N/A	Biopsy	N/A	1	0	0	0	PR	0	6.0	6.0	1	
Mani et al. 2007 ¹³¹	Case Report – V	1 / 1	65	Larynx	5.0	R	Superomedial	Bone	0	D, DV	Osteolytic	Biopsy	N/A	0	0	0	0	PD	0	1.0	1.0	0	
Su et al. 2007 ¹³²	Case Report – V	1 / 1	55	Uterus	18.0	R	Superolateral	Soft Tissue	1	DV, Pro, RAPD	Osteolytic	Complete	Exenteration	0	1, 50 Gy	0	1	PR	0	12.0	12.0	1	
Talwar et al. 2007 ¹³³	Case Report – V	1 / 1	30	Breast	15.0	R	Lateral	Muscle	0	Pro, S	N/A	Partial	N/A	0	1	Hormonal	1	PR	0	3.0	3.0	1	
Torres et al. 2007 ¹³⁴	Case Series – IV	2 / 0	65.5 (53-78)	2 Breast (100%)	26.0 (4-48)	1 L (50%) 1 R (50%)	1 Lateral (50%) 1 Superior (50%)	1 Bone (50%) 1 Soft Tissue (50%)	0	2 IM (100%) 1 D (50%) 1 Mass (50%) 1 Pro (50%)	N/A	2 Partial	N/A	1 (50%)	0	0	2	N/A	0	17.0 (2-32)	17.0 (2-32)	2 (100%)	
Uluocak et al. 2007 ¹³⁵	Case Report – V	1 / 0	73	Prostate	0	L	Superolateral	Soft Tissue	1	OP, Pro, VL	Osteolytic	FNAB	N/A	0	0	Hormonal	1	PR	0	12.0	12.0	0	
Alsuhaibani et al. 2008 ¹³⁶	Case Report – V	1 / 0	90	Prostate	12.0	L	Medial	Muscle	0	D, OP	N/A	Biopsy	N/A	0	1	0	1	PR	0	8.0	8.0	0	
Hatton et al. 2008 ¹³⁷	Case Report – V	1 / 1	24	Soft Tissue	24.0	B	Doffise	Muscle	0	IM, Pro, RAPD, S	N/A	Biopsy	N/A	0	1	0	0	PD	0	2.0	2.0	0	
Henning et al. 2008 ¹³⁸	Case Report – V	1 / 0	60	Lung	0	R	Superomedial	Bone	0	D, Pro, S	N/A	Biopsy	N/A	1	0	0	0	PD	0	6.0	6.0	0	
Hirunwiwatkul et al. 2008 ¹³⁹	Case Report – V	1 / 1	74	Liver	0	R	Lateral	Bone	1	DV, IM, OP, Pro, Pt, RAPD	Osteolytic	Biopsy	N/A	1	1	0	0	PD	0	2.0	2.0	0	
Kiratli et al. 2008 ¹⁴⁰	Case Report – V	1 / 0	74	Carcinoid	36.0	R	Inferior	Muscle	0	D, Pro	N/A	Complete	N/A	1	0	0	1	PR	0	24.0	24.0	1	
Kuo et al. 2008 ¹⁴¹	Case Report – V	1 / 1	66	Breast	£1.0	R	Superior	Fat	0	S	N/A	Biopsy	N/A	1	0	0	1	CR	0	3.0	3.0	1	
Milman et al. 2008 ¹⁴²	Case Report – V	1 / 1	83	Breast	336.0	L	Diffuse	Muscle	0	IM, Mass	N/A	Partial	N/A	1	0	Hormonal	1	PR	0	15.0	15.0	1	
Mudiyanseelage et al. 2008 ¹⁴³	Case Report – V	1 / 1	60	Kidney	0	L	Medial	Muscle	0	D, Pro	N/A	Complete	N/A	1	0	0	1	N/A	0	3.0	3.0	1	
Peng et al. 2008 ¹⁴⁴	Case Report – V	1 / 0	72	Prostate	0	L	Inferomedial	Soft Tissue	0	Mass, Pro	N/A	Complete	Exenteration	N/A	N/A	N/A	N/A	N/A	0	60.0	60.0	1	
Pitts et al. 2008 ¹⁴⁵	Case Series – IV	2 / 1	54 (47-61)	2 Liver (100%)	0	2 L (100%)	2 Lateral (100%)	2 Soft Tissue (100%)	2 (100%)	1 OP, Pro (50%) 1 DV, S (50%) 1 RAPD (50%)	2 Osteolytic (100%)	2 FNAB (100%)	N/A	0	1 (50%), 10 Gy	0	0	2 PD (100%)	0	1 (0.5-2)	1 (0.5-2)	0	
Polito et al. 2008 ¹⁴⁶	Case Report – V	1 / 0	65	Breast	60.0	L	Inferior	Fat	0	En	0	Biopsy	N/A	0	1, 30 Gy	0	1	PR	0	15.0	15.0	0	
Preechawal et al. 2008 ¹⁴⁷	Case Report – V	1 / 0	48	Kidney	0	L	Superior	Muscle	0	IM, Mass, Pro, Pt	N/A	Biopsy	N/A	0	0	0	0	PD	0	2.0	2.0	0	

Rocha Filho et al. 2008 ¹⁴⁸	Case Report – V	1 / 1	66	Thyroid	0	R	Superolateral	Bone	0	Pro	N/A	Biopsy	N/A	1	1, 37.5 Gy	0	0	SD	0	3.0	3.0	1
Seiff et al. 2008 ¹⁴⁹	Case Report – V	1 / 1	46	Thyroid	256.0	L	Inferior	Muscle	0	Mass, Pro	N/A	Partial	N/A	0	0	0	1	PR	0	2.0	2.0	1
Souayah et al. 2008 ¹⁵⁰	Case Report – V	1 / 0	49	Stomach	0	R	Lateral	Muscle	0	D, IM, S	N/A	Biopsy	N/A	0	1	0	0	PD	0	2.5	2.5	0
Surace et al. 2008 ¹⁵¹	Case Report – V	1 / 1	73	Breast	420.0	L	Diffuse	Muscle	0	D, En, IM, Pt	N/A	Biopsy	N/A	0	0	Hormonal	1	PR	0	3.0	3.0	1
Gosslee et al. 2009 ¹⁵²	Case Report – V	1 / 1	36	Cervix	30.0	L	Superolateral	Bone	0	IM, Mass, OP, S	N/A	Partial	N/A	0	1	0	1	PR	0	3.0	3.0	1
Nirmala et al. 2009 ¹⁵³	Case Report – V	1 / 0	62	Thymus	19.0	L	Medial	Soft Tissue	0	DV, Pro	N/A	FNAB	N/A	0	1, 40 Gy	0	1	PR	0	3.0	3.0	1
Slagle et al. 2009 ¹⁵⁴	Case Report – V	1 / 0	61	CUP	0	R	Superior	Muscle	0	D, OP	Osteolytic	FNAB	N/A	0	1, 33 Gy	0	0	PD	0	6.0	6.0	1
Valenzuela et al. 2009 ¹⁵⁵	Case Series – IV	80 / 36 (45%)	60	23 Breast (28.7%) 16 Melanoma (20%) 10 Prostate (12.5%) 7 Carcinoid (8.8%) 6 Skin (7.5%) 5 Lung (6.3%) 3 Colorectal (3.8%) 3 Salivary (3.8%) 2 Bone (2.5%) 2 Ovary (2.5%) 2 Uterus (2.5%) 1 Liver (1.2%)	N/A	39 L (48.8%) 39 R (48.8%) 2 B (2.5%)	18 Medial (22.5%) 14 Lateral (17.5%) 11 Posterior (13.8%) 11 Superior (13.8%)	34 Fat (42.5%) 22 Muscle (27.5%) 22 Soft Tissue (27.5%)	0	39 D (48.8%) 33 OP (41.2%) 24 VL (30%) 23 Pro (28.8%) 20 S (25%) 13 Pt (16.3%) 9 Mass (11.3%)	6 Osteolytic (7.5%)	58 Biopsy (72.5%) 14 FNAB (17.5%) 8 Partial (10%)	N/A	19 (23.8%)	54 (67.5%)	18 Hormonal (22.5%)	N/A	N/A	0	18.0	18.0	N/A
Barahimi et al. 2010 ¹⁵⁶	Case Report – V	1 / 0	68	Prostate	72.0	R	Lateral	Soft Tissue	0	IM, OP, Pt, RE, S	N/A	Biopsy	N/A	0	0	0	0	PD	0	8.0	8.0	0
Foo et al. 2010 ¹⁵⁷	Case Report – V	1 / 0	71	Pancreas	0	L	Lateral	Soft Tissue	0	D, DV, OP, RAPD	N/A	Partial	Decompression	0	1	0	0	SD	0	1.0	1.0	0
Francone et al. 2010 ¹⁵⁸	Case Report – V	1 / 1	66	Breast	0	R	Inferior	Soft Tissue	0	S	N/A	Biopsy	N/A	1	1	Hormonal	1	PR	0	12.0	12.0	1
Hassane et al. 2010 ¹⁵⁹	Case Report – V	1 / 0	61	Esophagus	0	L	Superolateral	Bone	1	OP, Mass	Osteolytic	Biopsy	N/A	0	0	0	0	PD	0	1.0	1.0	‘
Matsuo et al. 2010 ¹⁶⁰	Case Report – V	1 / 1	72	Carcinoid	9.0	R	Medial	Muscle	0	DV, S	N/A	Partial	N/A	0	1, 44 Gy	0	0	SD	0	3.0	3.0	1
Ng et al. 2010 ¹⁶¹	Case Report – V	1 / 0	55	Esophagus	12.0	B	Superior	Soft Tissue	0	Pro, Pt	N/A	Biopsy	N/A	1	1, 30 Gy	0	1	PR	0	3.0	3.0	0
Patel et al. 2010 ¹⁶²	Case Report – V	1 / 0	69	Prostate	0	R	Superior	Bone	1	Pro, Pt	Osteoblastic	Biopsy	Decompression	0	0	Hormonal	1	PR	0	6.0	6.0	1
Eckardt et al. 2011 ¹⁶³	Case Report – V	1 / 1	63	Breast	36.0	L	Superolateral	Bone	1	D, OP, Pro	Osteolytic	Biopsy	N/A	1	0	Hormonal	1	N/A	0	3.0	3.0	1
Galm et al. 2011 ¹⁶⁴	Case Report – V	1 / 0	75	Larynx	10.0	L	Superior	Soft Tissue	0	OP, RAPD, RE	N/A	Biopsy	N/A	0	0	0	0	PD	0	1.0	1.0	0
Guerriero et al. 2011 ¹⁶⁵	Case Report – V	1 / 0	45	Liver	288.0	L	Superolateral	Soft Tissue	0	D, Mass, OP, Pro	Osteolytic	Biopsy	N/A	0	1	0	1	PR	0	3.0	3.0	1
Gupta et al. 2011 ¹⁶⁶	Case Report – V	1 / 1	46	Breast	0	L	Inferomedial	Muscle	0	OP, S	N/A	Complete	N/A	0	0	0	1	CR	0	6.0	6.0	1
Janicijevic-Petrovic et al. 2011 ¹⁶⁷	Case Report – V	1 / 1	45	Breast	0	R	Posterior	Soft Tissue	0	Pro	N/A	Biopsy	N/A	N/A	N/A	N/A	N/A	N/A	0	3.0	3.0	1
Konoglou et al. 2011 ¹⁶⁸	Case Report – V	1 / 0	69	Lung	0	R	Inferolateral	Fat	0	Pro	N/A	FNAB	N/A	1	0	0	1	CR	0	4.0	4.0	0
Li et al. 2011 ¹⁶⁹	Case Report – V	1 / 0	26	Small bowel	72.0	L	Superolateral	Bone	1	D, Pro	Osteolytic	Partial	N/A	1	1	0	1	PR	0	3.0	3.0	1
Murthy et al. 2011 ¹⁷⁰	Case Report – V	1 / 1	61	Breast	24.0	B	Diffuse	Muscle	0	D, IM	N/A	Biopsy	N/A	0	1, 54 Gy	Hormonal	1	PR	0	18.0	18.0	1

Mustapha et al. 2011 ¹⁷¹	Case Report – V	1 / 0	25	Liver	0	R	Superolateral	Soft Tissue	0	DV, Pro, S	N/A	FNAB	N/A	0	0	0	0	N/A	0	1.0	1.0	0
Rosado et al. 2011 ¹⁷²	Case Report – V	1 / 0	74	Prostate	60.0	R	Superolateral	Bone	1	D, IM, Pro	Osteolytic	Biopsy	N/A	0	0	Hormonal	1	PR	0	8.0	8.0	0
Zarogoulidis et al. 2011 ¹⁷³	Case Report – V	1 / 1	38	Lung	0	R	Posterio	Soft Tissue	0	D	N/A	FNAB	N/A	1	1, 30 Gy	0	1	N/A	0	3.0	3.0	1
Charles et al. 2012 ¹⁷⁴	Case Report – V	1 / 0	24	Colorectal	7.0	L	Superior	Soft Tissue	0	Mass, Pro	N/A	Biopsy	N/A	1	1	0	1	N/A	0	3.0	3.0	1
Chen et al. 2012 ¹⁷⁵	Case Report – V	1 / 1	51	Soft Tissue	72.0	L	Medial	Muscle	0	D, DV, Pro	N/A	Partial	N/A	0	0	0	1	N/A	0	12.0	12.0	1
Dmuchowska et al. 2012 ¹⁷⁶	Case Report – V	1 / 1	53	Breast	0	R	Superior	Bone	1	IM, Pt	N/A	Partial	N/A	0	1	0	1	N/A	0	3.0	3.0	1
Jiang et al. 2012 ¹⁷⁷	Case Report – V	1 / 0	44	Liver	17.0	B	Diffuse	Muscle	0	D, IM, Pro	N/A	Biopsy	N/A	0	1	0	1	N/A	0	3.0	3.0	1
Jung et al. 2012 ¹⁷⁸	Case Report – V	1 / 0	50	Kidney	72.0	L	Medial	Soft Tissue	0	IM, Pro	Osteolytic	Complete	Exenteration	0	0	Immunothera py	1	CR	0	72.0	72.0	1
Kim et al. 2012 ¹⁷⁹	Case Report – V	1 / 1	50	Breast	0	R	Diffuse	Soft Tissue	0	D, Pro, S	N/A	Biopsy	Decompressi on	1	0	Hormonal	1	N/A	0	3.0	3.0	1
Pecen et al. 2012 ¹⁸⁰	Case Report – V	1 / 0	59	Liver	0	R	Posterior	Fat	0	D, IM, Pro, Pt, S	N/A	Complete	Exenteration	1	0	0	1	N/A	0	7.0	7.0	0
SooHoo et al. 2012 ¹⁸¹	Case Report – V	1 / 1	53	Bladder	1.0	R	Superolateral	Soft Tissue	0	Pt	N/A	Biopsy	N/A	0	0	0	N/A	N/A	0	3.0	3.0	0
Tomizawa et al. 2012 ¹⁸²	Case Report – V	1 / 1	70	Breast	0	R	Posterior	Fat	0	DV, RE, S	N/A	Biopsy	N/A	0	0	0	1	N/A	0	3.0	3.0	1
Wladis et al. 2012 ¹⁸³	Case Report – V	1 / 1	18	Soft Tissue	18.0	R	Superomedial	Fat	0	Mass, Pro	N/A	Biopsy	N/A	1	1, 30 Gy	0	1	PR	0	2.0	6.0	0
Woo et al. 2012 ¹⁸⁴	Case Report – V	1 / 1	65	Small bowel	72.0	L	Lateral	Fat	0	Mass	N/A	Partial	N/A	0	0	0	1	N/A	0	6.0	6.0	1
Dobson et al. 2013 ¹⁸⁵	Case Report – V	1 / 0	65	Carcinoid	9.0	L	Inferomedial	Fat	0	Mass	N/A	Partial	N/A	0	0	Radioiodine	1	PR	1	41.0	50.0	1
Fini et al. 2013 ¹⁸⁶	Case Report – V	1 / 1	70	Breast	96.0	B	Diffuse	Soft Tissue	0	OP, Pt	N/A	Partial	N/A	0	0	0	1	N/A	0	3.0	3.0	1
Fujimoto et al. 2013 ¹⁸⁷	Case Report – V	1 / 1	56	Gallbladder	24.0	L	Lateral	Bone	0	OP, S	Osteolytic	Biopsy	N/A	0	SRS	0	1	PR	0	12.0	12.0	1
Patel et al. 2013 ¹⁸⁸	Case Report – V	1 / 0	57	Soft Tissue	24.0	L	Lateral	Soft Tissue	0	Pro, RE	N/A	Partial	N/A	1	SRS	0	0	PD	0	3.0	3.0	0
Patel et al. 2013 ¹⁸⁹	Case Report – V	1 / 1	47	Breast	18.0	R	Medial	Fat	0	DV	N/A	Biopsy	N/A	N/A	N/A	N/A	N/A	N/A	0	3.0	3.0	1
Coloma-Gonzalez et al. 2014 ¹⁹⁰	Case Report – V	1 / 0	56	Kidney	0	L	Lateral	Bone	0	Mass, Pt	Osteolytic	Partial	N/A	0	0	Immunothera py	0	PD	0	3.0	3.0	1
Eldesouky et al. 2014 ¹⁹¹	Case Series – IV	6 / 0	62 (55-70)	6 Liver (100%)	6.0 (0-16)	4 L (66.7%) 2 R (33.3%)	6 Superolateral (100%)	3 Soft Tissue (50%) 3 Bone (50%)	1 (16.7%)	5 Pro (83.3%) 2 Mass (33.3%) 1 IM (16.7%) 1 Pt (16.7%) 1 OP, RE, S (16.7%)	5 Osteolytic (83.3%)	N/A	N/A	6 (100%)	6 (100%)	0	N/A	N/A	0	10.0 (6-10)	10.0 (6-10)	1 (16.7%)
Greene et al. 2014 ¹⁹²	Case Series – IV	15 / 3 (20%)	66 (25-84)	15 Melanoma (100%)	N/A	11 L (73.3%) 2 B (13.3%) 2 R (13.3%)	4 Medial (26.7%) 3 Posterior (20%) 3 Superior (20%) 2 Superomedial (13.3%) 1 Diffuse (6.7%) 1 Superolateral (6.7%)	11 Soft Tissue (73.3%) 4 Muscle (26.7%)	N/A	9 Pro (60%) 7 IM (46.7%) 3 Pt (20%) 2 DV (13.3%) 2 OP (13.3%) 1 S (6.7%) 1 No sympt (6.7%)	N/A	N/A	8 (53.3%)	7 (46.7%), 33 Gy	5Immunother apy (33.3%)	N/A	6 SD (40%) 4 PR (26.7%) 1 PD (6.7%)	0	15.5 (1-84)	15.5 (1-84)	3 (20%)	
Kapur et al. 2014 ¹⁹³	Case Report – V	1 / 0	79	Prostate	0	R	Superolateral	Soft Tissue	0	D, DV, Pro	N/A	Biopsy	N/A	1	0	Hormonal	1	PR	0	8.0	8.0	1

Ludmir et al. 2014 ¹⁹⁴	Case Report – V	1 / 0	82	Colorectal	0	R	Superomedial	Fat	0	OP	N/A	Biopsy	N/A	0	1, 30 Gy	0	0	PD	0	6.0	6.0	0
Saffra et al. 2014 ¹⁹⁵	Case Report – V	1 / 1	46	Breast	0	L	Medial	Muscle	0	D, OP, Pt, RAPD	N/A	Biopsy	N/A	1	0	Hormonal	1	PR	0	12.0	12.0	1
Gupta et al. 2015 ¹⁹⁶	Case Report – V	1 / 1	52	Thyroid	0	R	Lateral	Muscle	0	D, DV, OP	N/A	Partial	N/A	0	GK, 20 Gy	0	0	PR	0	18.0	18.0	1
Magliozzi et al. 2015 ¹⁹⁷	Case Series – IV	91 / 51 (56%)	N/A	36 Breast (39.6%) 16 CUP (10 Lung 10 Kidney 4 Pharynx 4 Salivary 3 Melanoma 3 Pharynx 3 Skin 2 Smallbowel 1 Bladder 1 Prostate 1 Thyroid	45.0	50 R (54.9%) 41 L (45%)	N/A	N/A	N/A	68 Pro (74.7%) 51 IM (56%) 43 Pt (47.3%) 40 DV (44%) 34 Mass (37.4%) 30 D (33%) 11 OP (12.1%) 4 En (4.4%)	17 Osteolytic (18.7%)	30 Biopsy (33%) 24 FNAB (26.4%) 32 Partial (35.2%) 5 Complete (5.5%)	5Exenteratio n (5.5%)	57 (62.6%)	24 (26.4%)	0	N/A	N/A	0	13.5	13.5	2 (2.2%)
Magrath et al. 2015 ¹⁹⁸	Case Series – IV	2 / 1 (50%)	54 (51-57)	1 Bladder (50%) 1 Esophagus (50%)	0.5 (0-1)	1 L (50%) 1 R (50%)	1 Posterior (50%) 1 Superior (50%)	1 Fat (50%) 1 Soft Tissue (50%)	1 (50%)	2 IM (100%) 2 Pro (100%) 1 DV (50%) 1 OP (50%)	N/A	2 Biopsy (100%)	N/A	0	1 (50%)	0	0	SD	0	3.0 (2-4)	3.0 (2-4)	1 (50%)
Pagsisihan et al. 2015 ¹⁹⁹	Case Report – V	1 / 1	49	Thyroid	0	R	Superolateral	Bone	0	D, DV, Mass, Pt	Osteolytic	Biopsy	N/A	0	0	Radioiodine	1	PR	0	6.0	6.0	1
Pearlman et al. 2015 ²⁰⁰	Case Report – V	1 / 0	33	Colorectal	0	R	Superior	Soft Tissue	1	D, DV, OP, Pro	Osteolytic	Partial	Decompressi on	1	1	0	1	PD	1	11.0	11.0	0
Rajabi et al. 2015 ²⁰¹	Case Report – V	1 / 0	19	Bone	20.0	L	Lateral	Soft Tissue	0	IM, Pro	Osteolytic	Complete	N/A	1	1	0	1	N/A	0	3.0	3.0	1
Arthur et al. 2016 ²⁰²	Case Report – V	1 / 1	27	Cervix	2.0	L	Medial	Bone	0	D, DV, Pro, RAPD	N/A	Biopsy	N/A	1	1, 30 Gy	0	1	PR	0	12.0	12.0	1
Foster et al. 2016 ²⁰³	Case Report – V	1 / 1	67	Colorectal	0	L	Diffuse	Muscle	0	D, Pro, RAPD	N/A	Biopsy	N/A	1	0	0	0	N/A	0	2.0	2.0	0
MacLean et al. 2016 ²⁰⁴	Case Report – V	1 / 0	39	Thymus	0	L	Medial	Soft Tissue	0	DV, IM, RAPD, S	N/A	Partial	Decompressi on	1	1	0	1	PR	0	2.0	2.0	1
Pokharel et al. 2016 ²⁰⁵	Case Report – V	1 / 0	66	Small bowel	0	R	Superior	Fat	0	Mass, Pro	N/A	Partial	N/A	0	0	0	1	N/A	0	2.0	2.0	1
Tabai et al. 2016 ²⁰⁶	Case Report – V	1 / 1	32	Breast	0	L	Medial	Bone	1	D, OP, Pro	N/A	Biopsy	N/A	1	0	0	0	N/A	0	2.0	2.0	0
Tun et al. 2016 ²⁰⁷	Case Report – V	1 / 0	73	Prostate	60.0	L	Lateral	Bone	1	DV, OP, Pro	Osteolytic	Complete	N/A	N/A	N/A	N/A	N/A	N/A	0	2.0	2.0	1
AufferHeide et al. 2017 ²⁰⁸	Case Report – V	1 / 0	52	Prostate	0	L	Lateral	Bone	1	Mass, OP	Osteolytic	Complete	N/A	N/A	N/A	N/A	N/A	N/A	0	2.0	2.0	1
Geske et al. 2017 ²⁰⁹	Case Series – IV	3 / 1 (33.3%)	59 (56-63)	3 Liver (100%)	0 (0-1)	2 L (66.7%) 1 R (33.3%)	3 Superolateral (100%)	2 Bone (66.7%) 1 Soft Tissue (33.3%)	1 (33.3%)	2 Mass (66.7%) 2 RAPD (66.7%) 1 OP (33.3%) 1 VL (33.3%)	2 Osteolytic (66.7%)	2 FNAB (66.7%) 1 Biopsy (33.3%) 1 Partial (33.3%)	1Decompress ion (33.3%)	0	3 (100%)	0	1 (33.3%)	2 PD (66.7%) 1 PR (33.3%)	0	8.0 (1-11)	8.0 (1-11)	0
Huang et al. 2017 ²¹⁰	Case Report – V	1 / 0	64	Carcinoid	0	L	Posterior	Soft Tissue	0	DV, OP, Pt	N/A	Complete	N/A	0	0	0	1	N/A	0	6.0	6.0	0
Marginean et al. 2017 ²¹¹	Case Report – V	1 / 1	56	Breast	0	L	Superolateral	Muscle	0	D, DV, IM	N/A	Partial	N/A	N/A	N/A	N/A	N/A	N/A	0	1.0	1.0	1
Nabeel et al. 2017 ²¹²	Case Report – V	1 / 1	48	Colorectal	0	R	Superolateral	Fat	0	Pro, Pt	N/A	Biopsy	N/A	1	1	0	1	N/A	0	7.0	7.0	0
Nash et al. 2017 ²¹³	Case Report – V	1 / 1	55	Cervix	0	L	Superomedial	Soft Tissue	0	OP, Pro, RE, S	N/A	Partial	N/A	0	0	0	0	N/A	0	1.0	1.0	0

Rakul Nambiar et al. 2017 ²¹⁴	Case Report – V	1 / 1	56	Breast	0	L	Superolateral	Soft Tissue	0	IM, Pro	N/A	Complete	N/A	0	0	Hormonal	1	N/A	0	7.0	7.0	1
Rasool et al. 2017 ²¹⁵	Case Report – V	1 / 1	48	Soft Tissue	0	L	Posterior	Muscle	0	D, DV, OP, Pro	N/A	Complete	N/A	1	1	0	1	CR	0	18.0	18.0	1
Wang et al. 2017 ²¹⁶	Case Report – V	1 / 0	66	Breast	72.0	R	Superomedial	Muscle	0	D, Pro	N/A	Biopsy	N/A	0	0	Hormonal	1	N/A	0	8.0	8.0	1
Coutinho et al. 2018 ²¹⁷	Case Report – V	1 / 1	68	Breast	0	L	Superolateral	Muscle	0	D, DV Pro	N/A	Biopsy	N/A	1	0	0	1	PR	0	38.0	38.0	0
Das et al. 2018 ²¹⁸	Case Series – IV	5 / 3 (60%)	68 (61-72)	5 Carcinoid (100%)	60 (12-244)	3 B (60%) 1 L (20%) 1 R (20%)	3 Diffuse (60%) 1 Lateral (20%) 1 Medial (20%)	5 Muscle (100%)	0	3 D (60%) 1 OP (20%) 1 Pro (20%) 1 S (20%) 1 No sympt (20%)	N/A	N/A	N/A	2 (40%)	4 (80%)	0	N/A	2 PR (40%) 2 SD (40%)	0	6.0 (2-120)	2.0 (2-120)	4 (80%)
Dutton et al. 2018 ²¹⁹	Case Report – V	1 / 0	33	Testes	22.0	R	Superolateral	Soft Tissue	0	VL	Osteolytic	Partial	N/A	1	1	0	1	CR	1	9.0	48.0	1
Gulmez-Sevim et al. 2018 ²²⁰	Case Report – V	1 / 1	69	Thyroid	0	R	Superolateral	Bone	1	D, DV, RAPD	Osteolytic	Complete	N/A	0	0	Radioiodine	N/A	N/A	0	3.0	3.0	1
Nifosi et al. 2018 ²²¹	Case Report – V	1 / 1	46	Breast	34.0	L	Medial	Muscle	0	D, IM, OP, Pro	N/A	FNAB	N/A	1	SRS, 30 Gy	0	1	PR	0	3.0	3.0	1
Pinto-Proenca et al. 2018 ²²²	Case Report – V	1 / 1	66	Breast	0	L	Inferomedial	Soft Tissue	0	Mass	N/A	Partial	N/A	1	0	Hormonal	1	PR	0	60.0	60.0	1
Ramsey et al. 2018 ²²³	Case Report – V	1 / 0	71	Soft Tissue	30.0	L	Superomedial	Soft Tissue	0	D, Pt	N/A	Complete	Exenteration	1	1, 64 Gy	Immunothera py	N/A	N/A	0	29.0	29.0	1
Roelofs et al. 2018 ²²⁴	Case Report – V	1 / 1	66	Small bowel	84.0	L	Superior	Muscle	0	DV, Pro	N/A	Complete	N/A	1	0	0	1	PR	1	8.0	9.0	1
Rong et al. 2018 ²²⁵	Case Report – V	1 / 0	51	Pancreas	0	L	Lateral	Muscle	0	D, DV, RAPD	N/A	Partial	Decompressi on	N/A	N/A	N/A	N/A	N/A	0	3.0	3.0	1
Shaikh et al. 2018 ²²⁶	Case Report – V	1 / 0	58	Breast	0	R	Diffuse	Sift Tissue	0	DV, Mass, OP	N/A	Biopsy	N/A	1	0	0	N/A	N/A	0	3.0	3.0	1
Chumdermpadetsuk et al. 2019 ²²⁷	Case Report – V	1 / 0	22	Kidney	0	R	Superolateral	Bone	1	D, DV, OP	Osteolytic	Complete	N/A	1	SRS	0	1	CR	0	6.0	6.0	1
Crisostomo et al. 2019 ²²⁸	Case Report – V	1 / 0	56	Lung	10.0	L	Medial	Muscle	0	D, Pro, RAPD, RE	N/A	Biopsy	N/A	0	0	0	0	N/A	0	3.0	3.0	0
Cruzado-Sanchez et al. 2019 ²²⁹	Case Report – V	1 / 1	60	Lung	0	R	Superior	Fat	0	IM, Mass, Pro	N/A	FNAB	N/A	N/A	N/A	N/A	N/A	N/A	0	1.0	1.0	1
Espinosa-Barberi et al. 2019 ²³⁰	Case Series – IV	2 / 1	66 (63-69)	1 Breast (50%) 1 Lung (50%)	6.0 (0-12)	1 B (50%) 1 R (50%)	1 Lateral (50%) 1 Superolateral (50%)	1 Bone (50%) 1 Muscle (50%)	0	1 D, Pro, VL (50%) 1 D, IM, Pro (50%)	1 Osteolytic (50%)	2 FNAB (100%)	N/A	1 (50%)	1 (50%)	1 Hormonal (50%)	1 (50%)	1 PD (50%)	0	2.5 (2-3)	2.5 (2-3)	1 (50%)
Framarino-dei-Malatesta et al. 2019 ²³¹	Case Report – V	1 / 1	44	Breast	84.0	R	Inferior	Muscle	0	D, DV, IM	N/A	Biopsy	N/A	1	SRS, 40 Gy	Hormonal	1	PR	0	20.0	20.0	1
Hernandez Pardines et al. 2019 ²³²	Case Report – V	1 / 1	58	Breast	0	L	Lateral	Muscle	0	D, IM	N/A	Biopsy	N/A	1	0	0	0	SD	0	2.0	2.0	1
Kagusa et al. 2019 ²³³	Case Report – V	1 / 0	64	Cervix	7.0	R	Medial	Soft Tissue	0	D, IM, Pro	N/A	Complete	N/A	1	1, 60 Gy	0	1	PR	0	2.0	2.0	0
Kiziloglu et al. 2019 ²³⁴	Case Report – V	1 / 1	63	Breast	12.0	R	Medial	Muscle	0	D, IM	N/A	Biopsy	N/A	1	1, 45 Gy	0	1	PR	0	15.0	15.0	1
Kluska et al. 2019 ²³⁵	Case Report – V	1 / 1	63	Breast	132.0	L	Lateral	Muscle	0	VL	N/A	Partial	N/A	0	0	Hormonal	0	N/A	0	2.0	2.0	1
Kozubowska et al. 2019 ²³⁶	Case Report – V	1 / 0	73	Carcinoid	0	R	Inferomedial	Soft Tissue	0	D, IM, OP, RE, S	N/A	Partial	Decompressi on	0	0	Hormonal	1	N/A	0	4.0	4.0	1
Rider et al. 2019 ²³⁷	Case Series – IV	2 / 1	68 (49-87)	Adrenal Gland	12.5 (1-24)	2 R (100%)	2 Diffuse (100%)	2 Soft Tissue (100%)	2 (100%)	2 Mass (100%) 1 Pro (50%) 1 S (50%)	2 Osteolytic (100%)	1 Complete (50%) 1 Partial (50%)	1Decompress ion (50%)	0	1 (50%)	0	2 (100%)	1 PR (50%)	0	2.0 (1-3)	2.0 (1-3)	1 (50%)
Sochat et al. 2019 ²³⁸	Case Report – V	1 / 0	60	Liver	0	R	Lateral	Bone	0	D, Mass, Pro	Oncolytic	Partial	N/A	1	1, 37.5 Gy	0	1	CR	0	18.0	18.0	1

Tao et al. 2019 ²³⁹	Case Report – V	1 / 1	63	Breast	6.0	L	Superolateral	Soft Tissue	1	D	N/A	Complete	N/A	0	1, 52.5 Gy	Hormonal	1	CR	0	6.0	6.0	1
Yadav et al. 2019 ²⁴⁰	Case Report – V	1 / 0	60	Bladder	0	L	Superomedial	Muscle	0	DV, OP, Pro, RE	N/A	Complete	N/A	0	0	0	1	N/A	0	6.0	6.0	1
Yu et al. 2019 ²⁴¹	Case Report – V	1 / 1	43	Small bowel	48.0	L	Superolateral	Soft Tissue	0	Pro, VL	N/A	Complete	N/A	0	0	0	1	N/A	0	6.0	6.0	1
Bacorn et al. 2020 ²⁴²	Case Report – V	1 / 1	51	Colorectal	8.0	R	Superior	Fat	0	Pt, S	N/A	Biopsy	N/A	1	0	0	0	SD	0	6.0	6.0	0
Blohmer et al. 2020 ²⁴³	Case Series – IV	15 / 15 (100%)	N/A	15 Breast (100%)	26.0 (0-153.8)	7 R (46.7%) 5 L (33.3%) 3 B (20%)	N/A	5 Bone (33.3%) 5 Muscle (33.3%) 5 Fat (33.3%)	N/A	N/A	N/A	15 Surgery (100%)	N/A	14 (93.3%)	9 (60%)	0	N/A	N/A	0	2.0 (0.5-91.3)	2.0 (0.5-91.3)	2 (13.3%)
El Bakraoui et al. 2020 ²⁴⁴	Case Report – V	1 / 1	43	Breast	3.0	L	Superolateral	Soft Tissue	0	DV, Mass	Osteolytic	Biopsy	N/A	1	1, 60 Gy	0	1	PR	0	14.0	14.0	0
Halliday et al. 2020 ²⁴⁵	Case Report – V	1 / 0	79	Carcinoid	36.0	B	Diffuse	Muscle	0	D, Pro	N/A	Biopsy	N/A	1	1, 30 Gy	Hormonal	1	PR	0	12.0	12.0	1
Hoenck et al. 2020 ²⁴⁶	Case Report – V	1 / 1	58	Carcinoid	0	B	Diffuse	Muscle	0	DV, IM, Pt, RAPD, S	N/A	Biopsy	N/A	0	0	Hormonal	1	N/A	0	2.0	2.0	0
Long et al. 2020 ²⁴⁷	Case Report – V	1 / 0	84	Colorectal	0	R	Superolateral	Bone	1	Pro, Pt, RAPD	Osteolytic	Partial	N/A	1	1	0	N/A	N/A	0	3.0	3.0	1
Madabhavi et al. 2020 ²⁴⁸	Case Report – V	1 / 0	72	Liver	0	L	Superolateral	Bone	1	Mass, OP, Pro	Osteolytic	FNAB	N/A	1	0	0	1	PR	0	7.0	7.0	1
Mahuvakar et al. 2020 ²⁴⁹	Case Report – V	1 / 1	72	Kidney	96.0	R	Medial	Soft Tissue	0	D, IM, Pro	N/A	Complete	N/A	0	0	0	1	CR	0	6.0	6.0	1
Marotta et al. 2020 ²⁵⁰	Case Report – V	1 / 1	58	Breast	240.0	B	Superomedial	Muscle	0	D, Pt	N/A	Biopsy	N/A	1	1, 45 Gy	0	1	PR	0	3.0	3.0	1
Mian et al. 2020 ²⁵¹	Case Report – V	1 / 0	74	Mesothelium	18.0	L	Inferior	Muscle	0	Pro, RAPD	N/A	Partial	N/A	1	1, 25 Gy	0	1	PR	0	5.0	5.0	1
Montejano-Milner et al. 2020 ²⁵²	Case Series – IV	10 / 5 (50%)	62.5 (43-82)	4 Breast (40%) 2 Bladder (20%) 2 Lung (20%) 1 Ovary (10%) 1 Pharynx (10%)	N/A	5 L (50%) 4 R (40%) 1 B (10%)	5 Posterior (50%) 3 Diffuse (30%) 1 Inferolateral (10%) 1 Superior (10%)	4 Soft Tissue (40%) 3 Muscle (30%) 2 Fat (20%) 1 Bone (10%)	N/A	5 D (50%) 3 DV (30%) 3 Mass (30%) 3 OP (30%) 3 Pro (30%) 1 En (10%) 1 RE (10%) 1 S (10%)	N/A	8 Surgery (100%) 1 Complete (10%) 2 Biopsy (20%)	N/A	3 (30%)	3 (30%)	1 Hormonal (10%)	N/A	N/A	0	5.5 (1-54)	5.5 (1-54)	1 (10%)
Narayanan et al. 2020 ²⁵³	Case Report – V	1 / 1	52	Melanoma	0	R	Lateral	Soft Tissue	0	IM, Pro	N/A	Biopsy	N/A	1	0	0	0	N/A	0	3.0	3.0	0
Pastore et al. 2020 ²⁵⁴	Case Report – V	1 / 0	72	Prostate	0	L	Superomedial	Soft Tissue	1	DV, Pro	Osteolytic	FNAB	N/A	0	0	Hormonal	1	N/A	0	18.0	18.0	0
Protopapa et al. 2020 ²⁵⁵	Case Report – V	1 / 0	53	Liver	0	L	Superomedial	Bone	1	Mass, VL	Osteolytic	Biopsy	N/A	0	1	0	0	N/A	0	3.0	3.0	1
Sindoni et al. 2020 ²⁵⁶	Case Series – IV	28 / 28 (100%)	56.3	28 Breast (100%)	60.0	18 L (64.3%) 10 R (35.7%)	N/A	N/A	N/A	14 Pro (50%) 4 D (14.3%) 4 Mass (14.3%) 2 En (7.1%) 2 Pt (7.1%) 2 S (7.1%)	N/A	28 Biopsy (100%)	N/A	26 (92.8%)	12 (42.8%)	0	N/A	N/A	0	26.4	26.4	18 (64.3%)
Tsuruta et al. 2020 ²⁵⁷	Case Report – V	1 / 1	60	Stomach	168.0	L	Superomedial	Soft Tissue	0	D, OP, VL	N/A	Biopsy	N/A	0	0	0	1	N/A	0	12.0	12.0	1
Wada et al. 2020 ²⁵⁸	Case Report – V	1 / 0	79	Prostate	0	L	Superomedial	Soft Tissue	0	DV, Pt	N/A	Biopsy	N/A	0	0	Hormonal	1	PR	0	3.0	3.0	1
El-Khazen Dupuis et al. 2021 ²⁵⁹	Case Series – IV	2 / 2	75 (74-76)	2 Breast (100%)	0	1 B (50%) 1 L (50%)	1 Diffuse (50%) 1 Posterior (50%)	1 Muscle (50%) 1 Soft Tissue (50%) ⁹	0	2 D (100%) 2 En (100%) 1 DV, IM, Mass, Pro (50%)	N/A	1 Biopsy (50%)	N/A	1 (50%)	0	1 Hormonal (50%)	1 (50%)	1 PR (50%)	0	37.5 (3-72)	37.5 (3-72)	1 (50%)

Mendia et al. 2021 ²⁶⁰	Case Report – V	1 / 1	72	Cervix	1.0	L	Lateral	Fat	0	D, OP	N/A	Biopsy	N/A	1	1, 30 Gy	0	1	PD	0	4.0	4.0	0
Oprean et al. 2021 ²⁶¹	Case Report – V	1 / 1	57	Breast	0	L	Diffuse	Muscle	0	D, DV, Pro, Pt	N/A	Partial	N/A	0	1, 25 Gy	Hormonal	1	CR	1	46.0	53.0	0
Razem et al. 2021 ²⁶²	Case Report – V	1 / 1	33	Breast	1.0	L	Diffuse	Muscle	0	D, IM	N/A	Biopsy	N/A	0	0	Hormonal	1	CR	0	12.0	12.0	1

Abbreviations: **M**, Male; **F**, Female; **B**, bilateral; **L**, left; **Mid**, midline; **R**, right; **CUP**, carcinoma of unknown primary; **D**, diplopia; **DV**, decreased vision; **En**, enophthalmos; **IM**, impaired eye motility; **OP**, orbital pain; **Pro**, proptosis; **Pt**, ptosis; **RAPD**, relative afferent pupillary defect (cranial nerve III deficit); **RE**, red eye; **S**, swelling; **VL**, vision loss; **FNAB**, fine needle aspiration biopsy; **Complete**, resection 100% tumor; **Partial**, resection <100% tumor; **CK**, cyber-knife; **GK**, gamma-knife; **SRS**, stereotactic radiosurgery; **WBRT**, whole brain radiation therapy; **LITT**, laser interstitial thermal therapy; **CR**, Complete Response, **PR**, Partial Response, **SD**, Stable Disease; **PD**, Progression Disease; **PFS**, Progression-Free Survival; **OS**, Overall Survival; **N/A**, Not Available.

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