Tumori, 94: 59-64, 2008

Radiotherapy resources for the care of head and neck patients in Italy. A survey by the head and neck group of the Italian Association for Radiation Oncology (AIRO)

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ABSTRACT

Aims and background. In 2006 a survey was performed to define the resources available in Italy for the provision of radiotherapy services to head and neck cancer patients. This was the first initiative of the newly founded Head and Neck Group of the Italian Association for Radiation Oncology.

Methods. A questionnaire was sent to all 138 radiotherapy centers active in the country. Items investigated included total numbers of head and neck cancer patients treated per year, waiting time before the start of treatment, general technical issues, and integration with surgery and chemotherapy.

Results. Sixty-nine questionnaires were returned (50% response rate). The total number of patients treated was 4,670, averaging 68 cases per center. The larynx was the primary site most frequently involved. Average waiting time was 30 days and 47 days for nonresected and postoperative cases, respectively. The combination of chemotherapy and radiotherapy was delivered to nonresected and resected patients in 96% and 54% of centers, respectively. Survey response rates, waiting time, and the use of organ preservation protocols were the issues showing more variations across the country.

Conclusions. This survey provides important data on radiotherapy resources available for head and neck cancer patients in Italy. The evidence of significant differences across the country concerning several relevant issues and the potential for cooperative clinical efforts in this relatively rare group of diseases urge the Group to plan further initiatives.

Key words: *head and neck cancer, Italy, radiotherapy, resources, survey.*

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Received March 20, 2007;
accepted June 14, 2007.

Introduction

Cancers of the upper aerodigestive tract represent a relatively uncommon group of malignancies, usually considered as a whole in clinical practice under the broad term of head and neck (H&N) cancers. This heterogeneous group of diseases includes cancers arising from several primary anatomic sites such as the larynx, oropharynx, hypopharynx, nasopharynx, oral cavity, nasal fossae and paranasal sinuses, and salivary glands. Neck nodal metastases from an unknown primary site are also usually included in H&N cancers. Despite several differences in natural history, management and prognosis among the diseases included in this group, clinical oncology of the H&N region has emerged in recent years as one of the most unique and challenging fields within clinical oncology. Due to several factors, including relatively small numbers of

cases, technical and logistic requirements for optimal care, and impact of treatments on patients' quality of life, multicenter cooperation and multidisciplinarity have emerged as distinctive and crucial issues for clinical success in H&N oncology. However, even before the establishment of multidisciplinary initiatives, a basic requirement for improvement is the standardization of procedures, at the regional and national level, within individual medical specialties involved in the care of these patients.

We report herein on a survey performed in 2006, aimed at defining radiotherapy resources available to provide treatments to patients with H&N cancer in Italy. This represents the first initiative of the H&N Group of the Italian Association for Radiation Oncology, founded in Vicenza in 2005, and it is perceived as a preliminary step before embarking on further projects, including audits on more specific issues, the definition of treatment guidelines and the cooperation with other clinical societies (e.g., H&N surgery, medical oncology).

Material and methods

An online database has been available since 2004, at the AIRO web site, detailing essential characteristics of all radiation oncology centers across Italy. The database was thoroughly searched, and in December 2005 a questionnaire was sent to the heads of all 138 active centers. During 2006, nonresponding centers were contacted in order to increase the number of returned questionnaires, and the survey was closed on September 30, 2006. Taking 2004 as the reference year, the questionnaire asked for information on the following issues: number of H&N cases treated (per year) with radiotherapy, waiting list, basic technical items, routine use of clinical and/or technical guidelines, use of combined modality treatments, participation in research clinical trials. Due to the existence of a network of regional groups in the framework of AIRO activities, data are presented in Tables reporting subtotals according to geographic areas. This also gives the opportunity to evaluate potential unbalances in radiotherapy resource availability and usage between different regions across Italy. As some centers did not provide answers to all items in the questionnaire, the total number of available responses may differ slightly among the presented tables.

Results

Overall, 69 questionnaires were returned, for a 50% response rate (see Appendix for a complete list of participating centers). Response rate was much higher among centers run by the National Health System (60%) than among private facilities (11%). Table 1 shows the breakdown of response rates by geographic area: response rate ranged from 24% (south/islands) to 86% (north-east).

Table 1 - Survey response rates by geographic region

Geographic region	Eligible centers (NHS / private)	Responding centers	Response rate (%)
North-west (Piemonte/ Liguria)	18 (16/2)	10	55.6
North 1 (Lombardia)	23 (17/6)	11	47.8
North-east (Triveneto)	14 (13/1)	12	85.7
North 2 (Emilia-Romagna)	12 (11/1)	7	58.3
Central 1 (Toscana/Umbria)	13 (12/1)	10	77.0
Central 2 (Lazio/Marche/ Abruzzo/Molise)	21 (16/5)	10	47.6
South / Islands	37 (26/11)	9	24.3
Total	138 (111/27)	69	50

NHS, National Health System.

Data on total numbers of H&N cases treated per year are reported in Tables 2 and 3. The total number of cases treated per center ranged between 16 and 290, yielding an average of 68 cases per year. Average number of cases was smaller in centers located in central Italy (34) and larger in northern regions (85). Analysis of the AIRO database indicated that centers responding to the survey operated 60% of treatment units currently active in Italy. Table 3 shows the breakdown of cases by anatomical site of the primary, with larynx as the most common site.

The critical issue of waiting time before starting radiotherapy is analyzed in Table 4. Radiotherapy as the primary local treatment modality was delivered after an average waiting time of 30 days from treatment prescription, whereas postoperative radiation treatments started after an average of 47 days from surgery. Ranges by geographic region were similar for primary (24-40 days) and for postoperative treatments (35-54 days). Waiting time was longer in centers located in southern (primary treatments) and in central Italy (postoperative treatments).

The combination of radiotherapy with surgery or chemotherapy is reported in Tables 5 and 6. Overall, postoperative cases represented one third of the total

Table 2 - Number of treated patients per year (2004), by geographic region

Geographic region	No. of cases	Average	Range
North-west (Piemonte/ Liguria)	637	63.7	31-97
North 1 (Lombardia)	1006	91.5	23-290
North-east (Triveneto)	932	77.7	34-170
North 2 (Emilia-Romagna)	407	58.2	22-79
Central 1 (Toscana/Umbria)	695	69.5	33-202
Central 2 (Lazio/Marche/ Abruzzo/Molise)	337	33.7	16-80
South / Islands	656	72.9	23-280
Total	4670	67.7	16-290

Table 3 - Number of treated patients per year (2004), by primary anatomic site and geographic region

Geographic region	Oral cavity	Oro-pharynx	Hypo-pharynx	Larynx	Naso-pharynx	Paranasal sinuses	Salivary glands	UPS
North-west	111 (11.1)	147 (14.7)	74 (7.4)	178 (17.8)	42 (4.2)	33 (3.3)	34 (3.4)	20 (2.0)
North 1	200 (16.7)	195 (16.3)	95 (8.0)	329 (27.3)	79 (6.6)	32 (2.7)	49 (4.1)	35 (2.9)
North-east	157 (14.3)	219 (19.9)	111 (10.1)	284 (25.8)	65 (5.9)	46 (4.2)	42 (3.8)	72 (6.5)
North 2	57 (8.1)	81 (11.6)	39 (5.6)	125 (17.9)	43 (6.1)	20 (2.9)	31 (4.4)	14 (2.0)
Central 1	128 (12.8)	133 (13.3)	37 (3.7)	245 (24.5)	59 (5.9)	39 (3.9)	38 (3.8)	21 (2.1)
Central 2	61 (6.1)	48 (4.8)	26 (2.6)	116 (11.6)	31 (3.1)	27 (2.7)	19 (1.9)	13 (1.3)
South	125 (15.6)	75 (9.4)	47 (5.9)	166 (20.8)	57 (7.1)	30 (3.8)	46 (5.8)	25 (3.1)
Total	839 (12.3)	897 (13.3)	429 (6.3)	1443 (21.2)	376 (5.6)	227 (3.3)	259 (3.8)	200 (3.0)

UPS, nodal metastases from unknown primary site.
Numbers in brackets are the average numbers of treated cases per centre.

Table 4 - Average waiting time from treatment prescription to start of radiotherapy, by geographic region

Geographic region	No. of responding centers	Waiting time for primary RT (days)	Waiting time for post-operative RT (days)
North-west (Piemonte/Liguria)	10	26.4	46.5
North 1 (Lombardia)	11	23.6	35.0
North-east (Triveneto)	10	30.8	37.0
North 2 (Emilia-Romagna)	7	31.8	48.2
Central 1 (Toscana/Umbria)	10	29.1	54.3
Central 2 (Lazio/Marche/Abruzzo/Molise)	10	26.0	51.7
South / Islands	8	40.3	52.1
Total	66	29.6	47.0

Table 5 - Number of post-operative cases treated per year, by geographic region

Geographic region	No. of cases	Average per center	Range per region
North-west (Piemonte/Liguria)	204	20.4	10-50
North 1 (Lombardia)	315	32.0	6-130
North-east (Triveneto)	225	37.5	17-53
North 2 (Emilia-Romagna)	145	29.0	9-60
Central 1 (Toscana/Umbria)	229	25.5	3-95
Central 2 (Lazio/Marche/Abruzzo/Molise)	153	15.3	4-36
South / Islands	254	36.3	14-82
Total	1525	26.8	3-130

Table 6 - Centers performing combined modality (RT and chemotherapy) treatments in locally and/or regionally advanced cases, by geographic region

Geographic region	Responding centers	Primary RT and chemotherapy	Post-operative RT and chemotherapy
North-west (Piemonte/Liguria)	10	9	3
North 1 (Lombardia)	11	11	4
North-east (Triveneto)	12	12	10
North 2 (Emilia-Romagna)	7	6	4
Central 1 (Toscana/Umbria)	9	8	4
Central 2 (Lazio/Marche/Abruzzo/Molise)	10	10	6
South / Islands	9	9	6
Total	68	65 (95.6%)	37 (54.4%)

workload (range, 24-45%), and the number of postoperative cases per center averaged 27 (range, 3-130). Combined treatment with chemotherapy was delivered by almost all centers (66 of 68 responding) as a primary treatment in patients with locally and/or regionally advanced disease, whereas in the postsurgical setting this approach was used in high-risk cases only in 54% of centers.

Organ preservation protocols for laryngeal and hypopharyngeal tumors were used in 42 of 67 responding centers (63%), with chemotherapy and radiation given according to either a sequential or a concurrent approach. Organ preservation was more common in northern (74% of centers) than in southern regions (48%).

Discussion

This survey of radiotherapy resources for H&N cancer patients at the national level is the first to be reported in Italy, as far as we can ascertain. It has highlighted several areas of improvement, but also a potential for significant cooperative efforts (e.g., for clinical research). Due to the methodology used, i.e., a postal questionnaire, we acknowledge the potential for significant biases in interpreting the results of the survey. Any observation or conclusion based on data that cannot be verified (e.g., data concerning waiting time) should be made with great caution.

The overall response rate was 50%, but it ranged from 24% to 86% in different regions. These numbers may be compared with a 98% response rate reported by a similar national audit performed in the United Kingdom in 2000[1]. However, the number of all radiotherapy centers in the UK was 56, indicating a greater concentration of radiotherapy resources in the UK than in Italy and anticipating less difficulties in the audit process. Considering that centers responding to our survey operate approximately 60% of treatment units, reported data can be considered adequate to define a realistic picture of the provision of radiotherapy services across the country.

One relevant feature emerging from collected data is the heterogeneity between geographic regions, a point that recurs in several issues addressed by the questionnaire. Survey response rates, waiting time, use of organ preservation protocols and participation in clinical research were the issues with greater variations across the country. The issue of widespread variation in centers' performance is not a novel finding. The previously quoted national audit from the UK[1] also found relevant variations concerning both the quality of care between centers and waiting time to start treatment. Our data confirm that even in Italy variations in the provision of radiotherapy service may follow a geographic pattern.

Time elapsed from first referral to the start of radiotherapy is of particular concern as it may have a significant impact on clinical outcome[1-4]. According to our results, waiting time for primary treatment with radiation in responding centers averaged 29 days (range, 20-40 days). Comparison with other reports is subject to several biases due to variations in the definition of the initial time point (date of first outpatient appointment, date of referral to the multidisciplinary clinic, date of the pathologic diagnosis, date of radiotherapy prescription, etc.). Two surveys performed in Europe reported an average waiting time of 40 days both in Denmark[2] and in the UK[1]. Even longer waiting times have been reported, averaging 12 to 20 weeks in Australia and New Zealand[3], whereas in a comparative survey performed in North America the waiting time for a T2 N0 carcinoma of the larynx averaged 29 days in Canada and 10 days in the USA[4]. In another survey performed in England[5], only 60% of H&N cancer units stated that their patients could start radiotherapy within 6 weeks (42 days) of the diagnosis or surgery, the recommended maximum wait according to national guidelines.

Given the complexity of treatment for H&N cancers, the number of patients treated per year at a given center is a critical issue. In general, it may be anticipated that to optimally deliver complex treatments a higher degree of expertise is necessary, and therefore a relative centralization of H&N cases in large referral centers would be desirable. According to our data, this is not the case in Italy, with a wide range in the total number of H&N cases treated per year by responding centers (16-290). Again, this finding has been already reported from the UK: according to an audit performed in the South and West of England in 1997[6], including surgical and radiation treatments, the number of H&N cases treated yearly by individual hospitals ranged between 1 and 65. The corresponding number per radiation oncologist ranged between 1 and 51 (median, 10 treated cases per year).

The breakdown of the H&N patient population by primary site (Table 3) clearly shows that the number of cases treated at individual centers per year is inadequate to design and perform single institution clinical studies on cancers arising from specific anatomic sites. However, total numbers across the country anticipate the potential for multicenter cooperative programs, even considering less common presentations, and recent publications[7,8] confirm the feasibility and the scientific relevance of multiinstitutional efforts in this field.

This survey also showed some favorable aspects of radiotherapy services for H&N cancer in Italy. For instance, virtually all responding centers customarily deliver combined chemotherapy and radiotherapy treatments, now considered to be the standard of care in advanced stage patients[9]. The implementation of such a combined approach in the postoperative setting is, however, much less widespread, despite the publication in 2003 of two large randomized trials showing the su-

periority of this approach over radiation alone[10,11]. Interestingly, postoperative combined treatment has gained very low acceptance in the north-west of the country (30% *vs* 83% in the north-east *vs* an overall national average of 54%).

In conclusion this survey, the first to be reported in Italy, provides preliminary important data on the resources available for the delivery of radiotherapy to H&N cancer patients in the country. The evidence of significant variations across the nation concerning several relevant issues, and the potential for cooperative clinical efforts in this relatively rare group of diseases, urge the recently founded H&N Group of the Italian Association for Radiation Oncology to plan further initiatives. One such program, currently in progress, is the definition of comprehensive technical guidelines for the treatment of H&N cancer patients with radiotherapy. Preliminary steps are also underway to implement joint initiatives with other medical specialties involved in the care of H&N cancer patients in Italy. This approach follows a consolidated strategy that led in the past decades to the formation of multidisciplinary H&N oncologic societies throughout Western Europe and many other countries[12].

Appendix – List of participating Centers

Piemonte (7): Biella, Struttura Complessa di Radioterapia, Ospedale degli Infermi; Candiolo, IRCC Candiolo (Torino); Cuneo, SC di Radioterapia Oncologica, Azienda Ospedaliera S.Croce e Carle; Ivrea, UO Radioterapia ASL 9, Ospedale di Ivrea; Novara, UO di Radioterapia, Università di Novara; Torino, SCDU Radioterapia, Università di Torino; Torino, UO Radioterapia, Ospedale S. Giovanni Anticasede. *Liguria* (3): Genova, UO di Radioterapia, IST; Sanremo, Struttura Complessa di Radioterapia; Savona, Radioterapia Oncologica, Ospedale San Paolo. *Lombardia* (11): Bergamo, USC Radioterapia Oncologica, Ospedali Riuniti di Bergamo; Brescia, Istituto del Radio, Spedali Civili; Brescia, UO di Radioterapia Oncologica, Clinica S. Anna; Como, Divisione di Radioterapia Oncologica, AO S. Anna; Cremona, UO di Radioterapia, Ospedale di Cremona; Lecco, SC di Radioterapia, AO Ospedale di Lecco; Mantova, SC di Radioterapia "Ido Traldi", AO Carlo Poma; Milano, UO di Radioterapia, IRCCS S. Raffalele; Monza, UO di Radioterapia Oncologica, Ospedale S. Gerardo; Pavia, Radioterapia Oncologica, Policlinico San Matteo; Varese, UO di Radioterapia, Ospedale di Circolo. VENETO (8): Belluno, UO di Radioterapia, Ospedale San Martino; Legnago, UO di Radioterapia, Ospedale di Legnago; Mestre, UO di Radioterapia Oncologica, Ospedale Umberto I; Padova, UO di Radioterapia, Ospedale di Padova; Rovigo, UO di Radioterapia Oncologica, Ospedale di Rovigo; Treviso, UO di Radioterapia Oncologica, Ospedale di Treviso; Venezia, UO di Radioterapia, Ospedale Civile; Vicenza, UO di Radioterapia, Ospedale di Vicenza. *Trentino* (1): Trento, UO di Radioterapia, Ospedale S. Chiara. *Friuli-Venezia Giulia* (3): Aviano/Pordenone, Istituto Nazionale Tumori/Ospedale; Trieste, S.C. Radioterapia, Ospedale di Trieste; Udine, Istituto di Radioterapia Oncologica, AO S. Maria. *Emilia-Romagna* (7): Bologna, Radioterapia, Policlinico S. Orsola; Modena, Radioterapia Oncologica, AO, Università di Modena; Parma, UO Radioterapia, AO di Parma; Piacenza, Servizio di Radioterapia, USL Piacenza; Ravenna, Servizio di Radioterapia, OC di Ravenna; Ravenna, Servizio di Radioterapia, Villa Maria Cecilia Cotignola; Reggio Emilia, Radioterapia Oncologica "G. Prodi", Ospedale di Reggio Emilia. *Toscana* (8): Arezzo, UO di Radioterapia, Azienda ASL 8 Ospedale San Donato; Carrara, UO di Radioterapia, Civico Ospedale; Firenze, UO di Radioterapia, Policlinico Careggi/Università degli Studi; Firenze, UO di Radioterapia, Clinica Casa di Cura S. Chiara; Livorno, Radioterapia Oncologica, AO USL 6; Pisa, UO di Radioterapia, AOP Università di Pisa; Pistoia, UO di Radioterapia, Ospedale di Pistoia USL 3; Siena, UO di Radioterapia, Policlinico Le Scotte/Università degli Studi. *Umbria* (2): Perugia, SC di Radioterapia Oncologica, Azienda Ospedaliera/Università degli Studi; Terni, S.C. di Radioterapia Oncologica, Azienda Ospedaliera S. Maria. *Marche* (3): Ancona, SOD di Radioterapia, Azienda Ospedaliero Universitaria, Ospedali Riuniti Umberto I Lancisi; Ascoli Piceno, UOC Radioterapia, Ospedale di Ascoli Piceno; Macerata, Radioterapia Oncologica, ASUR Marche Zona Territoriale 9. *Abruzzo* (3): Chieti, UO di Radioterapia e Medicina Nucleare, Ospedale Clinicizzato SS Annunciata; L'Aquila, UO di Radioterapia, Ospedale Nuovo San Salvatore; Teramo, UO di Radioterapia, PO Mazzini. *Lazio* (3): Latina, UO di Radioterapia, Ospedale S.M. Goretti; Roma, Radioterapia, Policlinico A. Gemelli UCSC Roma; Viterbo, UO di Radioterapia, Ospedale Belcolle. *Molise* (1): Campobasso, UOC di Radioterapia, Università Cattolica S. Cuore. *Campania* (4): Napoli, S.C. di Radioterapia, Istituto Nazionale Tumori; Napoli, UOC Radioterapia, PO Ascalesi Napoli; Salerno, UO di Radioterapia Oncologica, A.O. S. Giovanni di Dio; San Giovanni Rotondo, UO Radioterapia, IRCCS S.G. Rotondo. *Basilicata* (1): Rionero in Vulture, UO di Radioterapia, CROB *Sicilia* (3): Messina, UO di Radioterapia Oncologica, Ospedale di Messina; Palermo, UO di Radioterapia, ARNAS Ospedale Civico di Palermo; Ragusa, UO di Radioterapia Oncologica, Ospedale Maria Paternò Arezzo. *Sardegna* (1): Cagliari, UO di Radioterapia, Ospedale Oncologico "A. Businco".

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