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Effect of early diagnosis, response to conventional therapies and possibility of recurrence of disease in different cancer patients in Bangladeshi adults

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Abstract

Recurrence is a great problem in cancer treatment. A proportion of cancer patients develop recurrence, even after curative resection. In the present study, data of a total 315 cancer patients, age between 22 to 60 years were analyzed, among them 130 patients were male and 185 were female. Patients were diagnosed with primary stage of cancer (72%) and secondary stage of cancer (28%). They were treated with either chemo-therapy or radiation therapy or surgery. We found that most patients show good response and improved clinical features on surgical removal than other treatment. Cancer may recur after conventional therapies and this recurrence may be prevented through early diagnosis and treatment, proper knowledge, life style change.

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Introduction

Cancer is a term of diseases where abnormal cells grow and divide without control, form a lump of tissue which can be malignant or benign. This is usually the result of damage to a number of regulatory mechanisms within the cell (Cooper 1992). Unlike the cells in benign tumors, cancer cells can invade nearby tissues and spread via a process known as metastasis, occurs when cancer cells become detached from the initial tumor and are carried through the bloodstream and lymphatic system to other parts of the body (Montague Borland *et al.,* 2001) . This eventually interferes with the function of normal cells and can lead to the death of the patient (Cooper, 1992).

Cancer can develop from almost any type of cells in the body. There are over 100 different types of cancer, each with its own pattern of growth and spread (Turrell and Mathers, 2001) while the risk factors for different cancers may be shared or unique, the cause may still be unknown (Tomatis, Aitio *et al.*, 1990). The risk factors for cancers that are known can be broadly divided into environmental and internal (host) factors. Environmental factors include chemicals, radiation and viruses. Internal or host factors include sex, age, nutritional status (Monirujjaman, Rahman *et al.*, 2012), hormones, immune conditions and inherited mutations (Montague, Borland *et al.*, 2001).

Cancer is one of the major causes of morbidity and mortality among the non communicable diseases in Bangladesh. It is the sixth leading cause of mortality in Bangladesh and the number of people developing cancer is expected to increase in huge number mainly because of ageing population and lifestyle factors (National Cancer Control Strategy Development, Bangladesh *et al*., 2008).

On a global scale, cancer has become a major public health problem and an increasingly important contributor to the burden of disease. Based on the most recent available international data, there were an estimated 12.7 million new cancer cases, 7.6 million deaths from cancer, and 28 million persons alive with cancer within five years from the initial diagnosis (Ferlay, Shin *et al.;* Boyle and Ferlay, 2005; Ferlay, Autier *et al.*, 2007). The most common cancers in the world were lung (1.61 million cases), breast (1.38 million), and colorectal cancer (1.24 million) (Ferlay, Shin *et al.,* 2008). Because of its poor prognosis, lung cancer was also the most common cause of death, followed by gastric and liver cancer (Ferlay, Shin *et al.;* Boyle and Ferlay, 2005; Ferlay, Autier *et al.,* 2007).

Once cancer is diagnosed a variety of possible treatment options are considered. The choice of treatment is determined by the types of cancer and the extent to which the disease has progressed. The limiting factor in cancer treatment is metastasis (Cooper, 1992). Till now the conventional therapies for cancer including surgery, chemotherapy, radiation therapy, immunotherapy, and vaccine therapy (Abeloff, Armitage *et al.*, 2008). The ultimate goal of each treatment is to destroy all of the cancer cells in the body. Sometimes cancer comes back after remission termed by recurrence. The terms "recurrence" used to indicate reappearance of disease after complete eradication (Madhusudan, Deplanque *et al.*, 2004). Cancer can come back in the same place as the original cancer or elsewhere in the body. Thus a cancer recurrence is classified by where in the body it recurs, but it is still named for the area where the primary cancer began.

Many studies have been done to see the cancer treatment and recurrence events (Little, DeMeester *et al.,* 1986; Touboul, Buffat *et al.,* 1999; Grossfeld, Chang *et al.,* 2000; Bartelink, Horiot *et al.,* 2001; Reitsamer, Peintinger *et al.,* 2004), and in present study, we sought to determine the rates of recurrence following treatments for different cancers using data from different hospitals in Bangladeshi adults. Specifically, we examine the outcomes of patients who were diagnosed with primary and secondary cancers, treated either chemotherapy, radiation therapy or surgery and their disease recurrence chance.

Method and Materials

Study design

This cross-sectional, multicentre study was carried out between January 1, 2010 and October 30, 2011. The outline of this study has been shown in the following chart:
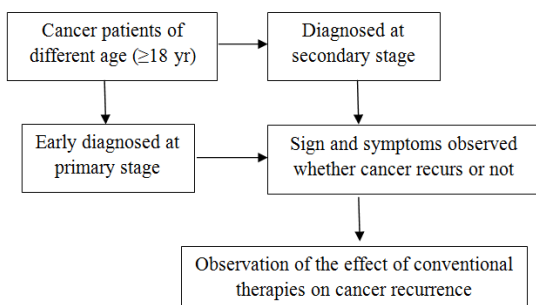
Study subjects and sites

A total of 315 Bangladeshi adults were enrolled in this study. Among them 130 were male and 185 were female. Only the cases histologically confirmed as cancer were included in our study. Before enrollment, each individual was informed about the objectives and full consent was taken. Subjects were diagnosed with primary or secondary cancer. We selected patients from different parts of Bangladesh to find an overall picture about cancer status, diagnosis procedures, therapies and recurrence rate. The patients were randomly selected and age ≤ 18 years were excluded from the study. We collected various tests data to see the cancer exist or not. Histopathological observation and PET-scan was seen to verify whether the cancer returns or not. The study was carried out in BSMMU and three different hospitals.

Early diagnostic methods

The most common types of diagnostic methods are biopsy, imaging tests, endoscopic tests, and laboratory tests. Our subjects were diagnosed with at least one of these tests. Cancer may be diagnosed at primary or secondary stage. Most of our study patients were go for biopsy tests and endoscopy, depending on the cancer status and availability of opportunities.

Diagnosis cancer recurrence

Cancer recurrences are diagnosed just like other cancers. However, tests are not always available to find out recurrence risk. Our study doctor suspected a cancer recurrence based on certain tests, patients signs and symptoms. After last round of conventional treatments our study patients were given a schedule of follow-up exams to check for cancer recurrences. Patients were informed about the signs and symptoms of the cancer recurrence. Recurrence may occur at the same or at the different sites. So it is very important to locate the site of cancer. All cancers are different, so patients were consulted about what type of cancer they have and what type of sign & symptoms they may experienced if cancer recurs. Any patient found with symptoms of cancer recurrence suggested immediately going for biopsies or Positron Emission Tomography (PET) scan to see the status. Immunohistochemistry was done to see the state of cancer of different patients. Immunostaining of the cancerous sites were quantified by measuring ACIA score and the results were expressed in ACIA score as follows- ACIA score = (total positive stained area× mean intensity of positive stained area) / total cell area.

Data analysis

Statistical analyses were performed using the statistical software packages SigmaStat (version 3.1; Systat Software Inc., Point Richmond, CA, USA) and SPSS for Windows (release 17; SPSS Inc, Chicago, Illinois, USA). Data were expressed as number of patients, n (% of patients) for categorical variables and calculating the mean with standard deviation or the median with 25-75 percentiles for quantitative variables.

Results

Demographic data of the study subjects

Average age and body weight of our study patients were 35.5 years and 50.2 kg, respectively. All patients that were selected in the study developed different types of cancer. The cancer sites and types were different from patient to patient. There were

no significant differences in the baseline characteristics of different patients (Table 1).

Table 1. Demographic features of different cancer patients enrolled in the study.

Features	Total study patients (N= 315) Values
Average Age, yrs	35.5 ± 13.70
Sex, Male: Female	26:37
Body weight, kg	50.24 ± 8.30
Duration of cancer, yrs	2.42 ± 1.40

Table 2. Clinical features of the patients at the time of enrollment.

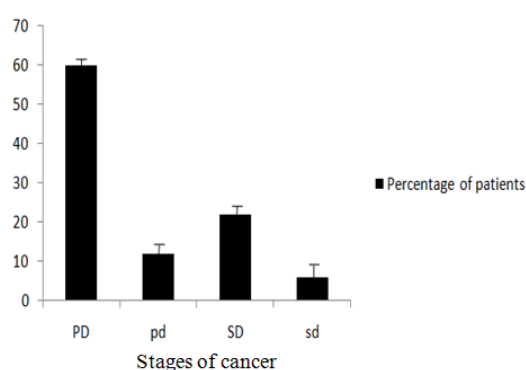| Features	Present, n (%)	Absent, n (%)
Fever	216 (68.57%)	99 (31.43%)
Cough	151 (47.94%)	161 (52.06%)
Weight loss	284 (90.16%)	31 (9.84%)
Chest pain	126 (40.0%)	189 (60.0%)
Whole body cramping	295 (93.65%)	20 (6.35%)
Shortness of breath	205 (65.08%)	110 (34.92%)
Habit of smoking or tobacco use	277 (87.94%)	38 (12.06%)

Fig. 1. Correlation of early diagnosis and recurrence of cancer.

Clinical features of the patients

The study patients had cancers at different stage. Most of patients had anorexia, nausea, appetite loss, weakness, chest pain, pain at whole body. We observed that the patients who were clinically weak mostly recur cancer. We asked different question according our questionnaire about the clinical conditions of the patients. There was no significant difference in clinical features of the different cancer patients (Table 2).
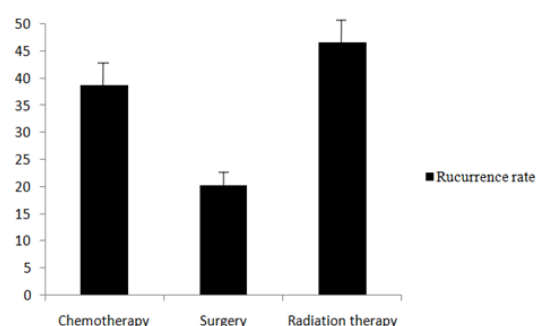

Fig. 2. Different therapies and cancer recurrence status.

Effect of early diagnosis in case of cancer recurrence

For most cancers, a recurrence at a site distant from where the cancer first began means the chance of cure is not good. We compare two groups of patients with same cancer (cervical cancer) at different stage those were treated with same therapies and found those patients who were early diagnosed with cancer with clinically improved far better than the patients diagnosed at the late stage of cancer. We found that 60% of our study patients who were diagnosed at early stage of cancer they were better in clinical features than that of patients (22%) diagnosed at the late stage. 12% of the patients were diagnosed at primary stage but were not improved as expected and 6% of the patients diagnosed at secondary stage were improved as early diagnosed patients (Fig. 1).

Different therapies and cancer recurrence

The available therapies for cancer are surgery, chemotherapy, radiation therapy, immunotherapy,

and vaccine therapy. Our study patients go for surgery, chemotherapy and radiation therapy. We found that 90 patients were treated with chemotherapy and among them 33 were recur cancer, 183 patients go for surgery and 48 patients among them suffer cancer recurrence and among 30 patients who were treated with radiation therapy 17 patients recur cancer. In this study we found that our study patients showed better response in clinical features with surgery than that of chemotherapy or radiation therapy (Fig. 2).

Discussion

Cancer is one of the leading causes of mortality in Bangladesh. There are different types of cancers. The pathology and type of progression of cancer patients is diverse (Nicolson 1984). It is said that cancer status is different as two people is unlike in the world. Chemotherapy, radio therapy and surgery are mainly available therapeutic options (Manjunatha; Abeloff, Armitage *et al.,* 2008). These conventional therapies are not highly effective because they are not able to fully inhibit the recurrence (Reilly, Nelson *et al.*, 1996; Creighton, Li *et al.,* 2009). We found that among the conventional therapies our patients showed good response to surgery. Cancer recurrence rate was less on surgery followed by chemotherapy.

Diagnosis of cancer is a vital issue in case of cancer recurrence. If cancer is diagnosed at the primary stage the response to the treatment is good than that of cancer diagnosed at the secondary stage (Moore, Flynn *et al.*, 1987). We found that our patients those were diagnosed at the early stage show improved clinical features than the cancer patients of secondary stage.

Watching for a cancer recurrence and cancer screening is different for the original cancer. And the goals of the two are different. For most forms of cancer, a local recurrence may still be curable, so early detection of a local recurrence is very important. From this study it is clear that cancer cure and cancer recurrence can be manage effectively if we detect the cancer at early stage and select a suitable treatment and medication plan. Severity and recurrence of cancer depends upon many conditions such as life style, food habit age, sex etc (Monirujjaman, Rahman *et al.,* 2012), but it is also important to observe the staging and effective therapy to lead a better life after cancer treatments. Patients should have knowledge about their sign and symptoms of recurrent cancer. Because most of the patient can't express that they are feeling unwell. Surgery after chemotherapy was more effective than other treatment options. If it is not possible to remove all of the recurrent cancer, treatment can often control tumor growth, reduce pain, manage side effects, and help the patient to lead a normal, active life for many years.

Here, PD-primarily diagnosed with improved clinical conditions, pd- primarily diagnosed but clinical conditions are not improved upon treatment, SD- secondarily diagnosed with improved clinical conditions, sd- secondarily diagnosed but clinical conditions are not improved upon treatment.

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