IHE Work Item Proposal (Short)

1. Proposed Work Item: <Cardiology Consult and Pathology Board>

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2. The Problem

In many countries, the high healthcare specialization is centralized in order to make available widely health resources limited, because they are often very expensive. For this reason, the hub and spoke model between peripheral hospitals and highly specialized hospitals is expanding. This is the case of cardiac surgery. In order to guarantee an optimal treatment strategy in specific field such as stable CAD (Coronary Artery Disease), NSTEMI (non-ST elevation myocardial infarction or UA (Unstable Angina), Italy is moving to the creation of teams of professionals able to perform a complete analysis of the more complex clinical cases. These teams are called **"Heart Team" (HT)** and they are responsible for the management of the clinical pathway for patients with stable multivessel CAD. The HT includes at least an interventional cardiologist and a cardiac surgeon, that may belong to different enterprises. Actually the use informal consultations between cardiologists and cardiac surgeons is the most frequent approach adopted.

Moreover, the two units (cath lab and cardiac surgery department) may be remote, being sometimes in different geographical areas. For this reason, management of patient data may be difficult and time consuming. In this respect, informative systems which manage clinical records allowing interchange of structured data and images as well as cineloops may provide a significant improvement in overall patient management.

For these reasons, the aim of this proposal is to define a standardized workflow to manage and coordinate remote interaction between hub and spoke in cardiological field (coronary artery disease and cardiac valvular diseases), with not only a simple consultation and sharing of information, but also the activation of a multidisciplinary board of healthcare professionals. The workflow will manage the cardiology teleconsultation in simple cases in which the sharing of information and the providing advice are sufficient, and it will manage the pathology board in the discussion of complex cases.

This approach will enable:

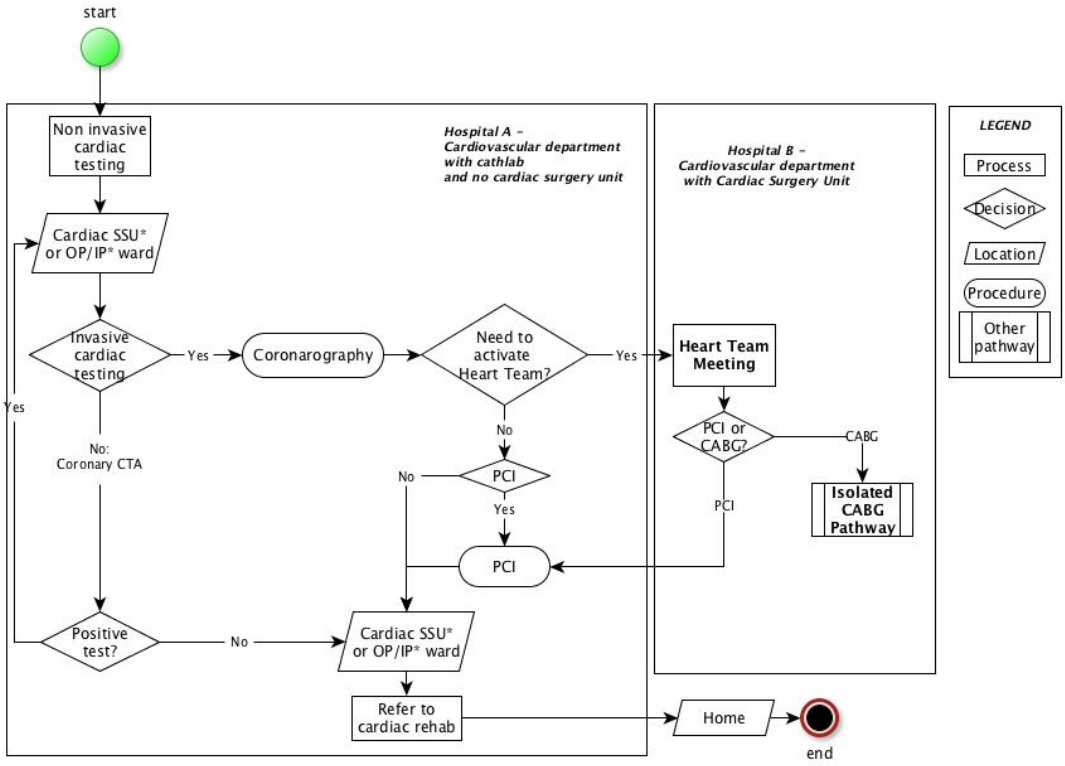
- direct/dynamic enrolment of clinicians in a HT: clinicians are involved in process in relation of their skills and availabilities so that they can be activated promptly;
- Definition of a clear process for the HUB center to address a consult request: on the basis of the consultation request, the guidelines of the process identifies specific physicians of

the HT to activate, the time of the response, which patient's clinical exams have to be exchange, how to reach an agreement between HT members and which data should be reported to the requester.

- Standardization of the HT decisional process: specific documents have to be provide to HT, specific activities have to be carried out on base of case of patient;
- Interaction/relationship with other clinical workflows related: workflow in HT can required input that are the final result of other workflows or triggers other activities managed from other workflows, for example reports produced a result from Referral Workflow, device's data from Monitoring Workflow, etc.

Figure 1 display a typical pathway for patient with stable CAD, highlighting the role of the HUB/SPOKE structure and processes in charge of the HT.

Figure 1 Typical pathway for patient with stable CAD



* SSU = Short Stay Unit; OP = Outpatient; IP = Inpatient.

2.1 Impact

The profile can be applied on a growing number of patients with cardiac problems. For example, on the world, 3.8 millions of man and 3.4 millions of female die for coronary heart disease each year (WHO, the global burden of disease: 2004 update). CAD is the most common type of heart disease and in 2008, 405,309 individuals died in the U.S. from this specific etiology. Every year, approximately 785,000 Americans suffer a first heart attack and another 470,000 will suffer an additional myocardial infarction (MI). In 2010, CAD alone was projected to cost the U.S. $108.9 billion including the cost of health care services, medications,

and lost productivity. (http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/cardiology/coronary-artery-disease/Default.htm).

3. Key Use Case

Use case #1 Activation and operating principles of the HT without IT infrastructure

The following Use Case illustrates the Workflow for the activation of the cardiological clinical Board (HT) and how it works.

Patient case

Wednesday, Dr. Smith, an interventional cardiologist in hospital A, visits a 67-year-old male patient with hypertension and without a previous history of cardiac disease started complaining of effort angina, CCS class III. The patient undergone to a cardiac echocardiogram to evaluate the heart functionality. The systolic function of the left ventricle was normal, with an ejection fraction of 60%. Dr. Smith decide to evaluate the patient with a coronary angiography the same week, revealing critical (90%) stenosis at the ostium of the left anterior descending (LAD) and left circumflex (LCX) coronary arteries, and diffuse disease of the right coronary artery (RCA). SYNTAX score is 20.

Patients with a multi-vessels stenosis and with SYNTAX score $\leq$22 shall be discussed in a weekly HT (http://www.ncbi.nlm.nih.gov/pubmed/23166211), which is held in hospital B.

This is a multidisciplinary and cross-enterprise meeting, where doctors discuss patients' cases.

Request

Dr. Smith sends a message to Dr. Johnson, the chairperson of the HT, asking for discussion of his patient at the next HT Review meeting. The request, sended via mail, contains main clinical patient data but not diagnostic images and videos.

Schedule

Dr Johnson reviews the case and decide to insert the discussion of the case in the next HT review meeting, that will be tomorrow. He informs Dr. Smith that the case is very urgent and it will be discussed tomorrow. Dr. Smith informs Dr. Johnson that can't supply videos within tomorrow. Dr. Johnson decides to shift the discussion of the case to the next week, increasing the decision time for the best patient treatment. Dr. Smith delivers all diagnostic images and videos (recorded in CD-ROMs) to the hospital B with an express courier service.

HT Meeting

The HT reviews clinical data, diagnostic images and video and on the basis of guidelines, decides for a CABG (Coronary Artery Bypass Graft) intervention.

Final Report

A final Decision Notice is sent to the Dr. Smith with the final assessment report, including specific reasons about the decision and the indications for the patient arrangements.

Use case #2 Activation and operating principles of the Heart Team with an IT infrastructure

Patient case

As in case #1, Dr. Smith decides that his patient needs a consultation by the HT (Hospital B).

Request

Dr. Smiths activates the request for a patient case submission to the referral heart surgery center. The request contains main clinical patient data to detect the level of urgency to suitably schedule the case discussion (eg. current and past medical history, medications, signs

and symptoms, laboratory reports, discharge summaries, diagnostic images and videos and electrocardiogram).

HT Notification

The whole HT is notified for the consult Request on the basis of the process workflow and analyzes the case.

Exchange data

All necessary diagnostic information are reachable by the HT.

Final Report

If an agreement is reached between professionals, a final Decision Notice is sent to the Dr. Smith with the formal and final assessment report, including specific reasons about the decision and the indications for the patient arrangements. If the Complexity of the case does not allow the professionals to agree on a shared approach to act on the patient, a Heart Team meeting is scheduled. Dr. Smith receives the response through the IT module and now he can inform the patient and closes the consultation process for his patient.

4. Standards & Systems

Systems that can be involved in the process described above are:

- CIS system
- Hospital EHR system
- HIS

The relying standards that can be adopted to address the use case are:

- XDS.b-I (Cross-Enterprise Document Sharing) for Imaging, XDS.b (Cross-Enterprise Document Sharing)
- DSUB (Document Metadata Subscription): this profile allows to create a notification infrastructure based the XDS.b Infrastructure
- XDW (Cross-Enterprise Document Workflow): this profile allows the creation of a Workflow management Infrastructure based on a XDS.b Environment. XDW guidelines provide a flexible tool that can be further profiled (defining a Workflow Definition profile) to manage specific clinical workflows.

5. Discussion

This proposal is submitted as new work item for the 2015/2016 cycle to the PCC domain due to the multidisciplinary nature of the workflow itself, but could benefit from the support of the CARDIOLOGY domain that may be interested in the topic.